FINAL ENVIRONMENTAL IMPACT STATEMENT

LANAI AIRPORT MASTER PLAN IMPROVEMENTS

Lanai Airport, Lanai, Hawaii

GOVERNOR JOHN D. WAIHEE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION

December 1990

PARK ENGINEERING
ARIES CONSULTANTS LTD.
Y. EBISU & ASSOCIATES, INC.

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May 7, 1991

MEMORANDUM

TO: The Honorable Edward Y. Hirata, Director
Department of Transportation

SUBJECT: Final Environmental Impact Statement:
Lanai Airport Master Plan Improvements

The Final Environmental Impact Statement for Lanai Airport Master Plan Improvements is hereby accepted in satisfactory fulfillment of the requirement of Chapter 343, Hawaii Revised Statutes.

This environmental impact statement will be a useful tool in the process of deciding if the action described therein should be allowed to proceed. My acceptance of the statement is an affirmation of the adequacy of that statement under the applicable laws and does not constitute an endorsement of the proposed action.

When the decision is made regarding the proposed action itself, I expect the proposing agency to consider if the societal benefits justify the environmental impacts which will likely occur. These impacts are adequately described in the statement and, together with the comments made by reviewers, provide a useful analysis of the proposed action.

John Waihee

JOHN WAIHEE

bcc: Hon. John Lewin

ADDENDUM NO.1

FINAL ENVIRONMENTAL IMPACT STATEMENT

LANAI AIRPORT MASTER PLAN

LANAI AIRPORT, LANAI, HAWAII

GOVERNOR JOHN D. WAIHEE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION

APRIL 1991

PARK ENGINEERING
ARIES CONSULTANTS LTD.
Y. EBISU & ASSOCIATES, INC.

ParEn, Inc. dba park engineering
Suite 300, Kawaiahao Plaza ☐ 567 South King Street, Honolulu, Hawaii 96813-3036 ☐ Telephone (808) 531-1676 ☐ FAX (808) 536-5996

April 10, 1991

Airports Division
Planning Section
Department of Transportation
Honolulu International Airport
Honolulu, HI 96819

Attention Messrs. Wally Nishigata and Dean Nakagawa:

Subject: Environmental Impact Statement
Lanai Airport Master Plan Improvements
Addendum No.1

A discussion on the " Summary of Unresolved Issues" was inadvertently omitted from the recently completed Environmental Impact Statement for Lanai Airport. The attached SECTION 13 entitled "SUMMARY OF UNRESOLVED ISSUES" addresses this issue and is submitted herewith as an addendum (ADDENDUM NO.1) to the subject EIS.

All of the concerns expressed by the reviewers of the EIS are presented in SECTION 12 as are the letter responses by the State Department of Transportation to those concerns.

We are transmitting herewith one (1) original and one hundred (100) copies of this addendum for distribution and for your use.

Sincerely yours,

ParEn, Inc.
dba PARK ENGINEERING

Reginald Suzuka
Project Manager

TC #112/FOLDER #968

SECTION 13

SUMMARY OF UNRESOLVED ISSUES

The comments and concerns of the reviewers of this document are presented in Section 12. The State Department of Transportation has addressed each of these comments and concerns in letters to the reviewing parties. Copies of these letters are also included in Section 12. Accordingly, there are no " Unresolved Issues" associated with the EIS for the proposed Lanai Airport Master Plan Improvements.

FINAL

ENVIRONMENTAL IMPACT STATEMENT

FOR THE

LANAI AIRPORT MASTER PLAN IMPROVEMENTS

LANAI, HAWAII

TMK: 4-9-02:1, 4-9-02:41, 4-9-02:46
and 4-9-02:47

This document has been prepared pursuant to
Chapter 343, Hawaii Revised Statutes and
The National Environmental Policy Act

PROPOSING AGENCIES:

State of Hawaii
Department of Transportation
Airports Division
Honolulu International Airport
Honolulu, Hawaii

Federal Aviation Administration
Honolulu District Office
300 Ala Moana Blvd.
Honolulu, Hawaii 96813

Responsible Official: Owen Miyamoto
Owen Miyamoto
Airports Administrator

Date: 12/20/90

Responsible Official: _____

Date: _____

Prepared By:

Park Engineering
Aries Consultants Ltd.
Y. Ebisu & Associates, Inc.

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SECTION 1

SECTION 1

INTRODUCTION AND SUMMARY

1.1 PURPOSE

In September 1988, the State of Hawaii, Department of Transportation, Airports Division, initiated a comprehensive planning study of Lanai Airport under the Federal Aviation Administration Airport Improvement Program. The firms of Park Engineering in association with Aries Consultants Ltd. and Y. Ebisu & Associates, Inc. were contracted to prepare the Airport Master Plan and an Airport Noise Compatibility Program. The purpose of the Master Plan study was to determine the type and extent of aviation facilities needed at Lanai Airport through the year 2005 and to prepare a Master Plan to satisfy these demand requirements.

A Noise Compatibility Program was developed for the Airport which addresses existing noise impacts and projects future noise impacts on the Airport environs. The Noise Compatibility Program recommends noise impact mitigation measures for adoption by local units of government in conjunction with their overall planning programs. The Noise Compatibility Program was developed in accordance with the requirements of Federal Aviation Regulations (FAR), Part 150, "Airport Noise Compatibility Planning."

The State of Hawaii Department of Transportation, Airports Division, has determined that an Environmental Impact Statement is required pursuant to Chapter 200 of Title II, Administrative Rules, Subchapter 5(b) and the National Environmental Policy Act. The Environmental Impact Statement has been prepared in accordance with Chapter 343, Hawaii Revised Statutes; National Environmental Policy Act (40 CFR Part 6), and the rules and regulations of the Office of Environmental Quality Control.

The Environmental Impact Statement includes relevant information on the proposed actions, existing environmental conditions, and an assessment of probable impacts and possible mitigation measures.

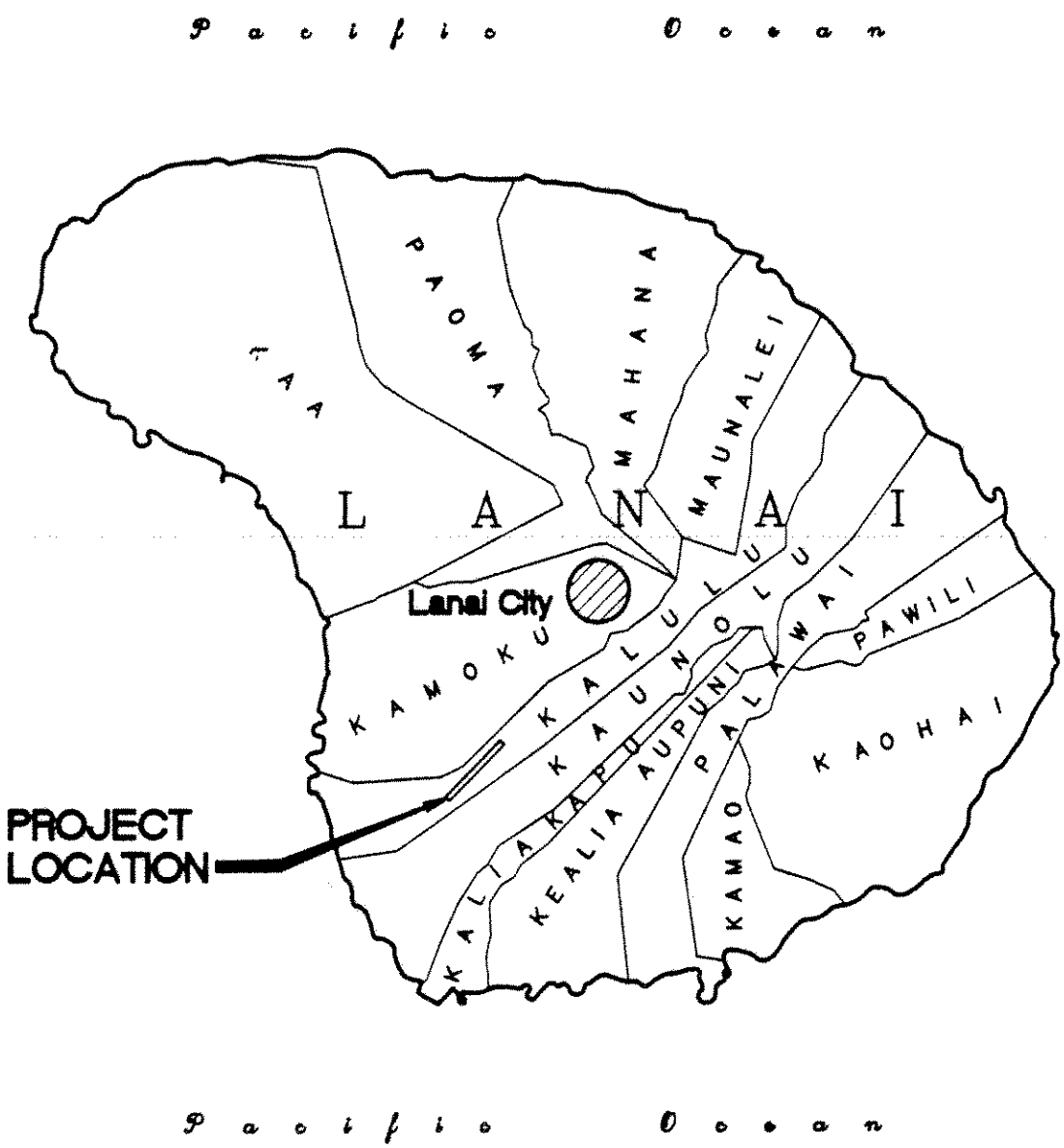
The Environmental Impact Statement and the Master Plan will be used as basic documents to support proposed State Land Use redesignation and amendments to the County's Lanai Community Plan and Interim Zoning Provisions.

1.2 PROJECT LOCATION

The Lanai Airport is located on the Island of Lanai three (3) miles southwest of Lanai City as illustrated on Figure 1-1. The existing Airport property encompasses approximately 93 acres of land.

1.3 PUBLIC PARTICIPATION PROGRAM

An integral part of the Master Plan program was the public participation program. The program consisted of two components: (1) public informational meetings and (2) a Technical Advisory Committee. Four public informational meetings were held during the development of the Master Plan. These meetings served to inform interested parties in the community on the progress of the Master Plan development and to solicit community input on the proposed Airport improvements.



Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

STATE PROJECT NO.
AIP PROJECT NO.

N

0 1 2 3
SCALE IN MILES

ParEn, Inc. dba
PARK ENGINEERING

LOCATION MAP

FIGURE 1-1

In addition to the informational meetings, a public hearing was held on the FAR Part 150 Noise Compatibility Program. A public hearing was held on August 21, 1990 to accept testimony on the Lanai Airport Master Plan Environmental Impact Statement associated with the proposed airport development. A record of the public hearing is appended (see Section 11) to this document.

A Technical Advisory Committee was organized for the purpose of reviewing and commenting on detailed aspects of the Master Plan and Noise Compatibility Program. The Technical Advisory Committee was made up of community leaders, airport users, and representatives from governmental agencies. The members of this committee and their affiliations are listed in Appendix A.

1.4 FORECASTS AND PROJECTIONS

1.4.1 AVIATION DEMAND FORECASTS

Table 1-1 presents forecasts of aviation demand at Lanai Airport for 1987 through 2005. The annual forecasts were prepared as part of the Airport Master Plan, and are from the report entitled "Lanai Airport Master Plan Report", April 1990. As described in that report, aviation demand at the Airport is forecast to increase as a result of the increase in tourists to Lanai as well as the general economic growth of the State. The total passenger volume at Lanai Airport is forecast to increase from 57,203 in 1987 to 200,000 in 2005, an overall increase of 250 percent.

The volume of cargo and mail is forecast to increase substantially from an estimated 1,000 tons in 1987 to 2,000 tons in 2005.

Total aircraft operations are forecast to increase from 16,176 in 1987 to 21,400 in 2005. By 2005, these operations are forecast to include 2,900 air carrier, 10,200 commuter/air taxi, 8,000 general aviation and 300 military aircraft operations.

1.4.2 AIRFIELD CAPACITY

The existing runway capacity is about 59 operations during visual flight rule (VFR) conditions. Existing peak hour operations are about 14 operations. The number of operations in the peak hour is projected at 18 operations per hour in 2005. The annual service volume (ASV) is about 115,000 operations for the current mix of aircraft and airfield facilities and approximately 150,000 operations for the mix of aircraft and airfield facilities forecast for 2005. A total of 21,400 annual operations are forecast by 2005.

1.5 PROPOSED ACTION

1.5.1 AIRFIELD FACILITIES

The major improvements proposed for the airfield consist of a 2,000-foot runway extension to the northeast, parallel and additional entry/exit taxiways, new holding aprons, and overlay of the existing runway pavement. The 2,000-foot extension will bring the ultimate length of the runway to 7,000 feet. The proposed improvements are based on the projected aviation demand, types of aircraft expected, and existing airfield conditions.

Table 1-1

AVIATION DEMAND FORECASTS
Lanai Airport
1987-2005

Activity	1987	1990	1995	2000	2005
Passenger Total (Enplaned and Deplaned)	57,203	100,000	140,000	170,000	200,000
Air carrier	17,741	50,000	85,000	110,000	140,000
Commuter/air taxi	39,542	50,000	55,000	60,000	60,000
Cargo and Mail (tons) (Enplaned and Deplaned)	1,000[a]	1,000	1,400	1,700	2,000
Aircraft Operations					
Air carrier	886	1,400	2,200	2,900	2,900
Commuter/air taxi	10,490	11,200	10,800	10,400	10,200
General aviation	4,500	5,000	6,000	7,000	8,000
Military	300	300	300	300	300
Total	16,176	17,900	19,300	20,600	21,400
Based Aircraft	-0-	1	2	3	4

a. Estimate based on discussions with cargo operators

Source: Aries Consultants Ltd.

Additional lighting and navigational systems are planned including an Instrument Landing System (ILS) and Approach Lighting System (MALSR) for Runway 3, upgraded High Intensity Runway Lights (HIRL) and Automated Weather Observation System (AWOS).

1.5.2 TERMINAL AND AIRPORT SUPPORT FACILITIES

The proposed terminal and airport support facilities expansion has been planned to allow for future expansion of the Airport beyond the year 2005. Relocation of certain facilities will be necessary to provide for efficient airport operations.

Major terminal facilities proposed include a new interisland passenger terminal, new and expanded air cargo facilities, new general aviation facilities, new helicopter air taxi facilities, expanded roadway and parking facilities, ground transportation area and airport support areas.

The terminal complex expansion is proposed to be laid out in a linear pattern northeast and southwest of the existing facilities. Expansion of the passenger terminal complex, parking facilities and ground transportation extends to the south and west of the existing facilities. Major expansion to the northeast includes air cargo, general aviation, helicopter and support facilities.

1.6 RATIONALE FOR ACTION

The Airport Master Plan projects annual passenger and aircraft activities to the year 2005. The study indicated a substantial increase in aviation activities. Aviation activity in 1987 included 57,203 passengers and 16,176 aircraft operations. Aviation activity for Lanai Airport in 2005 is projected at 200,000 passengers and 21,400 aircraft operations. The Airport is currently experiencing congestion in airport operations with the present level of activity and limited facilities.

The proposed location of major facilities is based on expansion capability and efficiency in airport operations. Airfield improvements will provide for unrestricted operations for the aircraft types forecast to use the Airport in the Master Plan.

1.7 SUMMARY OF IMPACTS AND MITIGATION MEASURES

1.7.1 PHYSICAL ENVIRONMENT

1.7.1.1 Land Uses

The land uses surrounding the Lanai Airport are under agricultural cultivation for pineapple production. The nearest urbanized areas which could be subject to noise impacts from the Airport are Lanai City (approximately 3 miles to the northeast) and Kaumalapau Harbor (about 3 miles to the west).

1.7.1.2 Land Use Plans and Land Ownerships

Lanai Airport and all of the surrounding lands are designated State Agricultural.

The existing Lanai Airport comprises approximately 93 acres in the ahupuaa (district) of Kalulu on lands owned by the State of Hawaii. All of the surrounding lands (some of which may need to be acquired for future airport development and/or protection) are owned by Castle & Cooke, Inc.

The Lanai Community Plan (LCP) was mandated by the 1977 Charter of Maui County. Its purpose is to provide the detailed scheme for implementing the broad and long-range objectives/policies of the County General Plan for the Island of Lanai.

Since Lanai Airport is presently on land designated "Agricultural" on the State Land Use Map, there is no County Zoning and the provisions of the County Interim Zoning ordinance do not apply.

The closest urbanized areas are Lanai City located 3 miles to the northeast and Kaumalapau Harbor located 3 miles due west. A new resort hotel was recently completed at Koele. A second hotel at Manele, as well as new residential developments within Lanai City, are currently under construction.

The proposed project improvements will place additional agricultural land into airport use. It will therefore be necessary to amend the LCP to reflect the additional lands acquired for the expansion of the Airport.

1.7.1.3 Geography and Climate

Lanai Airport is located in the southwestern part of Lanai about 3 miles southwest of Lanai City. The major roadway, Kaumalapau Highway, connecting Lanai City to the harbor is 0.6 of a mile to the north of the Airport.

The climate on Lanai is generally mild with fairly uniform temperatures throughout the year. Since a large segment of Lanai is at a fairly high elevation (1,000 feet or more above mean sea level), the average temperatures are cooler than most of the other islands.

The rainfall on Lanai is relatively low due to the shielding effects of the rain-producing tradewinds by the Islands of Maui and Molokai.

No significant change to the climate on Lanai is expected as a result of the project.

1.7.1.4 Natural Hazards

The project site, atop a flat ridge with naturally sloping terrain on two sides, minimizes the flood hazard potential from off-site storm water flows. Existing storm drainage systems further mitigate potential storm drainage problems.

The 1985 Uniform Building Code rates potential damages to structures from seismic activities by zones on a scale of 0 to 4 ("0" being "No Damage"). Since the entire Island of Lanai is situated within Seismic Zone 1, the potential risk of damages to structures from earthquakes is low.

1.7.1.5 Flora and Fauna

There is very little of botanical interest within the lands proposed for the Airport expansion. Actively cultivated fields or weedy shrub are the major vegetation types. Of the 43 species inventoried on the site, 39 (91 percent) are introduced. Because of the past agricultural activities, there are no sensitive native plant communities remaining on the study site. None of the native plants are rare, threatened, or endangered. Based on these findings, the proposed expansion of the Airport is not expected to have a significant impact on the total Island-wide populations of the species involved. The majority are introduced and the natives on the site also occur in similar environmental habitats throughout the Islands.

In a survey of the terrestrial vertebrate fauna in the areas proposed for expansion of the Airport, nine species of birds were observed and another was reported to occur there by knowledgeable informants. Another ten species, although not seen during the field survey, may occur at the site in small numbers, at a different season, or at night. No mammals were seen but gnawed pineapples indicate that at least one rat species is found there. No reptiles were seen during the survey. None of the animal species recorded at the site is considered threatened or endangered by the Federal and/or State Government. Based on these findings, the proposed project is not expected to have any significant impact on the biological communities of the study site.

1.7.1.6 Noise

The ambient noise levels (without aircraft noise contributions) in the vicinity of Lanai Airport range from 35 to 60 Ldn. By way of comparison, surf noise along unprotected stretches of shoreline ranges between 55 to 65 Ldn. Noise levels along the roadways to/from the Airport can exceed 60 Ldn, while noise levels of 35 to 50 Ldn exist in nearby areas removed from the Airport. Unlike more urbanized areas, there are no noise masking sources in the area to reduce the perceived noise levels from aircraft operations.
The audibility of perceived noises from aircraft operations at Lanai Airport is influenced by topographic and meteorological conditions. Wind direction and strength influences the related noises to urbanized areas. Seasonal thermal inversions also tend to influence the perceived acoustic influences from the Airport through sound "ducting". The relatively high elevations of both the Airport and Lanai City (1,200+ feet above sea level) when compared to known data concerning the average elevation of such inversion layers (generally 200 to 300 feet above sea level) make the potential for sound ducting effects upon noise levels low.

Existing, informal, noise abatement procedures for aircraft arriving and departing the Airport recommend that overflights of Lanai City be avoided. Winds permitting, approach/departure routes maximize overflights of vacant lands and attempt to minimize flights over populated areas (Lanai City, etc.).

1.7.1.7 Air Quality

The principal effects upon the air quality in the specific area of the Airport and the Island of Lanai in general will result from the operations of aircraft and support equipment (vehicle emissions, fuel vapors, etc.). Topographic and meteorological conditions may on occasion combine to allow for concentrations of pollutants. This combination would involve the "bowl" effect of Lanaihale's caldera, calm winds, and low-hanging clouds above the Airport and Lanai City.

Overall, the prevailing winds serve to disperse the incremental pollutant effects from the Airport and the air quality is considered as good.

1.7.1.8 Visual Quality

Implementation of the improvements recommended in the Master Plan will expand the visual impressions of the man-made facilities of the Airport in otherwise agricultural aesthetic views. This includes additional landscaping along the Airport access road and in the terminal area.

1.7.1.9 Historic and Cultural Resources

The State Historic Preservation Officer, Department of Land and Natural Resources (DLNR), has indicated that there are no known historic sites in the project area. A copy of the DLNR's letter dated October 9, 1989 is included in Appendix B.

Notwithstanding said determination by the DLNR, the State engaged Applied Research Group of the Bishop Museum to study/assess the potential existence of historic and cultural resources within the project area. The Museum found four objects believed to have potential archaeological significance (see Appendix C). As a result of these findings, a second study was performed. Subsequent, specific archaeological investigations have been conducted by Cultural Surveys Hawaii and a summary report prepared. This report (included as Appendix D) concludes in stating:

> The research indicates that the project area was utilized during traditional times for agriculture and probably associated habitation. Subsequent commercial pineapple cultivation has homogenized the landscape to such a degree that it is doubtful any subsurface cultural features still exist within the project area. No further archaeological work is deemed necessary. However, in the unlikely event a subsurface feature is unearthed during construction activities, "on-call" monitoring by a qualified archaeologist is recommended. This should include a contractual agreement to be "on-call," as well as analysis of any recovered materials.

1.7.1.10 Construction Impacts

Improvements proposed as part of the Lanai Airport Master Plan are recommended for construction in two phases over the 20-year planning period. Certain measures must be implemented during the construction period to ensure that no adverse impacts on the environment are generated. The measures include:

- Control of dust during the grading and construction phases
- Rerouting of natural drainage ways leading to the permanent realignment of drainage channels with sufficient capacity to handle potential surface water flows so as to avoid flooding on the Airport site and not to impede the irrigation system of the surrounding pineapple fields
- Schedule construction activities to control and minimize soil erosion

Construction activities will affect the air quality of the immediate area on a short-term basis due to equipment emissions and dust from grading.

Construction effects will be short-term in duration and generally limited to the immediate vicinity of the Airport.

1.7.2 SOCIAL AND ECONOMIC CONDITIONS

1.7.2.1 Population

The resident population has remained fairly stable at just over 2,000 residents over the past 26 years (By way of comparison, the resident population was 3,720 in 1940 and 3,136 in 1950). Lanai City is the Island's only urban area and over 98 percent of the resident population live there.

Based on the population projections presented in the 1981 Lanai Community Plan-Technical Report, the population of the Island is forecast to increase from the present 2,100 to 2,200 up to 3,200 by the year 2000. This was based on a projection of 200 visitor accommodation units on Lanai by the year 2000. In the 1983 Lanai Community Plan Report, the resident population was projected to increase to 4,500 over the next 20 years as a planning guideline.

With the development of the two new hotels on the Island the population is expected to grow more rapidly than previously forecast. The population is now forecast to reach 3,000 residents by 1995 with the two hotels in full operation. The population is forecast to reach 4,500 people by 2020 assuming the development of additional hotel units up to the 650 units currently zoned for approved by Maui County.

There were a total of 650 housing units on the Island in 1980, and over 70 percent were built prior to 1940. An additional 144 housing units were added in 1989 in the Lalakoa III subdivision in the southeast part of Lanai City. A 120-unit subdivision is also being planned at the southwest side of Lanai. Another 502 single-family residences and 132 multi-family units are permitted in the Koele Project District. A total of 342 single family and 74 multi-family units are permitted in the Manele Project District.

1.7.2.2 Economic Activity

The principal economic activity on Lanai has historically been pineapple production. However, this is likely to change in the near future as the visitor industry begins to play a more important role in the economy of Lanai.

About 98 percent of the 90,000 acres on the Island are owned by Castle & Cooke, Inc. The Dole Company, a subsidiary operates the pineapple plantation and is the only major employer on the Island. The number of jobs in the pineapple industry on Lanai has declined in recent years. The lack of job opportunities in recent years has resulted in a lot of people leaving Lanai, particularly young adults.

In 1986 there were an estimated 950 people employed on Lanai compared to 1,450 in 1976 and 1,100 in 1980. The Dole Company had about 550 full-time and 500 seasonal workers in 1986. Dole currently cultivates about 12,000 acres on Lanai, compared to 14,000 acres a few years ago.

While it is expected that pineapple production will continue to be a major economic activity on Lanai, other developments are expected to supplement the economic growth of the Island in the near future. However, it should be noted that Castle & Cooke, Inc., owners and operators of the pineapple production properties have recently announced their intention to terminate their pineapple farming operations on Lanai within the next two years.

The 1983 Lanai Community Plan recommended that pineapple cultivation be maintained as the primary activity. The Plan recommended promoting the visitor industry as a secondary economic activity by providing sites for hotel development. Other economic activity recommendations included the promotion of diversified agriculture, fishing and aquaculture industries, and job training programs for local residents.

The visitor industry will become a very significant part of the economy, employment and population growth on the Island within the next two years with the opening of the Koele and Manele Bay resorts. It is already having a major impact with the employment and economic activity currently generated by the construction of the hotels.

There are about 400 people presently employed in the construction of the new Koele and Manele Bay resorts, support facilities and housing development. This level is expected to decline with the opening of the Manele Bay Hotel in early 1991. However, at that time the employment associated with the operation of the hotels will increase. This is estimated to reach a level of over 700 employees with both resorts in operation.

Based on discussions with representatives of the Lanai Company, there are 102 units at the recently opened Koele Lodge and there will be another 250 units with the opening of the Manele Bay Hotel early in 1991.

The initial 352 hotel units would generate about 18,000 visitors per year with a 50 percent occupancy rate, and about 27,000 visitors per year with a 75 percent occupancy rate. With a total of 650 units, at 75 percent occupancy rate, the visitor level would reach about 50,000 visitors annually.

1.7.2.3 Farmland/Agricultural Uses

The area surrounding the Lanai Airport has been used for agricultural purposes (pineapple production) since the Nineteenth Century. Lanai Airport and all of the surrounding lands are designated State Agricultural.

Development associated with the implementation of the Master Plan will remove acreage from active agricultural production. This will result in the loss of a relatively small percent of the land use for pineapple production on the Island.

The acreage affected will not be substantial compared to the overall Island's pineapple producing acreage. Large acreages of currently uncultivated fields could be recultivated to replace those areas lost from pineapple production because of the expansion of the Airport. However, it should be noted that Castle & Cooke, Inc., owners and operators of the pineapple production properties have recently announced their intention to terminate their pineapple farming operations on Lanai within the next two years.

1.7.3 PUBLIC FACILITIES

1.7.3.1 Access, Circulation and Parking

The only major roadway on Lanai is Kaumalapau Highway, a State highway that connects Lanai City and Kaumalapau Harbor. Lanai Airport is located midway between the City and the Harbor and is connected to the highway via a narrow two-lane road. These roadways are adequate for the present traffic volume. However, as the air passenger traffic increases, some improvements to the Airport access road will be required. Kaumalapau Highway should also be improved where it intersects the Airport access road. It is recommended that a separate left turn lane be provided for airport bound traffic from Lanai City.

The present parking facility is inadequate during peak hours. To relieve some of the congestion, the State is currently providing additional interim parking facilities. For the long-term, the Master Plan provides ample parking for the public, airport employees and rental car operators.

Rental car and taxi services are currently provided at Lanai City. Space is provided in the Master Plan for these services on the Airport.

1.7.3.2 Potable Water Supply

The water system that serves Lanai Airport is a part of the overall Island of Lanai water system, owned and operated by the Dole Company. The Island's water system provides both drinking and irrigation water. The Airport's needs are supplied from a 2-1/2 inch diameter pipe along the Airport access road which interconnects to the 6-inch service line installed along Kaumalapau Highway. A storage reservoir and a larger transmission line will be required to meet the fire demand and the increase in domestic water demands at the Airport.

1.7.3.3 Wastewater Treatment and Disposal

Wastewater generated by users of the Airport is disposed of in two cesspools located on either side of the passenger terminal building. Since new State Health regulations will prohibit cesspool disposal, a new treatment facility will be required for the Airport. One of the designs to be investigated will be a system based on soil absorption technology.

1.7.3.4 Storm Drainage

As discussed in the section on Natural Hazards, the siting and topography of the Airport provide for natural drainage to the east (towards Miki Basin and west (to Kalamaiki Gulch). The natural drainage courses, together with airport-developed cross-runway underground culverts and drainage swales developed along the graded shoulder edges, are adequate for the present drainage needs. Most of the storm waters flowing to the Airport area eventually drain into Miki Basin.

1.7.3.5 Power and Communications

Electrical power supply to the Airport is provided by a Maui Electric Company (MECO) buried (7,200 volt) direct cable from Kaumalapau Highway. This line is a part of the main distribution system of MECO. At present the utility company is developing a new power plant at Miki Basin, and upon completion of this plant, the Kaumalapau Highway power line

from Miki Road to Lanai City will be upgraded to 12,470 volts. Minor upgrading of the airport-specific electric service lines will be necessary as the Master Plan expansion and/or improvement plans are implemented.

The existing 25 Kilowatt emergency power system will likely be inadequate after development of the new facilities within the Master Plan parameters. To ensure necessary emergency power to the Airport, a 75 Kilowatt generator system should be installed.

Telephone service for the Island of Lanai, including the Airport, is provided by the Hawaiian Telephone Company (HTCO). HTCO is in the process of improving and expanding the telephone service capabilities for the Island, due in part to proposed Castle & Cooke's development plans on the Island. Telephone service facilities in the Airport area include 25 pairs of aerial wires (24 currently in use) along Kaumalapau Highway and 50 pairs (14 currently in use) of direct-bury service cables serving the Airport. HTCO has proposed to increase the service capacity in the area by adding more service cables during 1990.

1.7.3.6 Lighting Systems

The existing runway has medium intensity runway lights (MIRL) and there are aircraft parking apron lights. The runway extension and existing runway will be equipped with high intensity runway lights (HIRL) in the future. Approach lighting system (MALSR), taxiway lights, aircraft parking apron, vehicular parking lot and roadway lights are recommended in the Master Plan.

1.7.3.7 Fuel Storage

At present, all aircraft are refueled at Kahului or Honolulu International Airports since no on-site fuel storage is available at Lanai Airport. The Master Plan will provide space for fuel storage to accommodate future demands.

1.7.3.8 Police Services

The Maui County Police Department provides regular services at the Airport on Mondays and Fridays only. The Department assigns officers for a 2-1/2 hour period to ensure security during arrival and departure of the charter flights for construction workers. "On-call" security at the Airport is provided, as necessary, by off duty police officers. Security in airport areas not open to the public is provided by DOT personnel (Airport Operations Control). With the expansion of the Airport, more stringent security measures and procedures will be required.

1.7.3.9 Aircraft Rescue and Firefighting Facilities

The two firefighting trucks which comprise the Airport's Aircraft Rescue and Firefighting (ARFF) facilities occupy a 2,160 square foot building adjacent to the passenger terminal. The Quick Response vehicle carries 500 gallons of water and 500 pounds of dry chemical; also available is a skid-mounted truck with 450 pounds dry chemical and 100-gallon premix systems, both operated by nitrogen. The County Fire Department is also available to respond to airport emergencies; however, no formal mutual aid agreement is in effect at present.

1.7.3.10 Medical Services

Lanai's only hospital is located in Lanai City. There is one doctor and a public health nurse who provide for most of the medical needs on the Island. The Department of Education has one nurse's aide assigned to the school. Medical services not available on Lanai are provided by quasi-governmental agencies on a transient basis once or twice a month. There is general agreement among those close to the medical community that existing facilities and services are inadequate.

1.7.3.11 Solid Waste Collection

Solid wastes generated at the Airport are collected in eight 30 gallon containers. Six are located within the main terminal building and two at the cargo/air commuter terminal building. The waste materials are collected daily by State DOT maintenance personnel and hauled to the County landfill located approximately 3/4 of a mile from the Airport. The existing landfill is, however, nearing its capacity and must be replaced in the near future. The County has tentatively selected a new site 3 miles west of Lanai City and 3 miles north of the Airport. A Negative Declaration has been filed with the Office of Environmental Quality Control for this new site.

1.8 RELATIONSHIP TO LAND USES AND POLICIES

Expansion of the Lanai Airport is generally consistent with the overall goals and objectives for the development of the State of Hawaii. The expanded airport facilities will serve as a major transportation facility for transporting passengers and cargo to and from Lanai and other airports in the State. The growing residential population and visitor industry on Lanai will benefit from the expanded passenger air carrier and air cargo operations.

The economy of the Island of Lanai will benefit by the addition of employment opportunities, both for short-term construction and long-term permanent employment.

The expansion of the Airport will preclude certain types of future development in the vicinity of the Airport. Future urban development (i.e., residential, schools) will not be permitted within areas exposed to high noise levels. However, based on forecast aviation activity as well as the location of current and future development on Lanai this will not pose any major land use incompatibilities.

1.9 ALTERNATIVES CONSIDERED

Alternative plans were developed to provide a range of development options for the Lanai Airport. The various facilities shown on the alternative plans could be combined, deleted or supplemented to develop the recommended Master Plan.

1.9.1 AIRFIELD ALTERNATIVES

Four airfield alternatives were considered with two single runway and two dual runway configurations. The alternatives considered included:

Alternative 1 - Extend existing Runway 3-21 to 6,000 feet.

Alternative 2 - Extend existing Runway 3-21 to 7,000 feet.

SECTION 2

SECTION 2

PROPOSED DEVELOPMENT PLAN

This section describes the existing facilities and conditions at Lanai Airport and proposed improvements developed as part of the Master Plan. In addition, this section identifies a proposed capital improvement program for phasing the recommended improvements, the rationale for the proposed action, permits and approvals needed and the alternatives considered.

Lanai Airport is located on the Island of Lanai three (3) miles southwest of Lanai City. The location of the Airport is shown on Figure 1-1. The Airport boundary encompasses 93 acres of land at approximately 1,300 feet above mean sea level (MSL). Lanai Airport is classified as a "Commercial Service Other Airport - Short-Haul" in the National Plan of Integrated Airport Systems (NPIAS) which typically serves short-haul air carrier routes of less than 500 miles. Existing facilities at Lanai Airport accommodate primarily interisland passenger and cargo operations.

2.1. EXISTING AIRPORT FACILITIES

The existing Airport facilities include the airfield, passenger and cargo terminals, navigational aids, access and parking and support and utility systems. The existing Airport facilities are illustrated on Figure 2-1. The current terminal area facilities are shown in more detail on Figure 2-2

2.1.1 AIRFIELD FACILITIES

Airfield related facilities include the runway, taxiway, aircraft parking apron, runway protection zones (formerly called clear zones), approach areas and obstructions and navigational facilities and lighting.

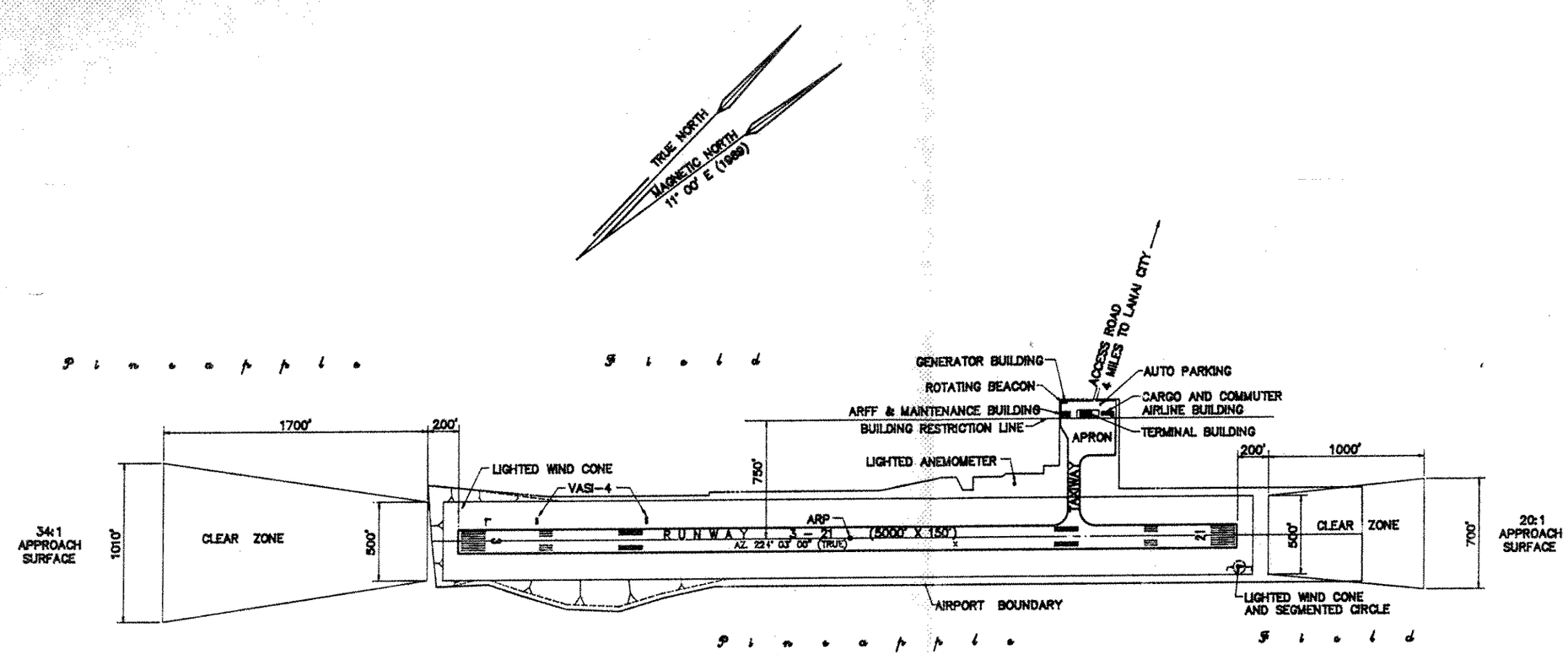
2.1.1.1 Runway 3-21

There is one runway, Runway 3-21 which is 5,000 feet long and 150 feet wide, aligned in an approximate northeast-southwest direction. The effective gradient is 0.06% sloping downward to the southwest.

Runway 3-21 has an asphalt pavement with an aggregate friction seal coat, with estimated pavement strengths, in terms of maximum gross weight (pounds), as defined by aircraft landing gear configuration as follows:

Single-wheel (S)	45,000
Dual-wheel (D)	70,000
Dual-tandem (DT)	110,000

It should be noted that Aloha Airlines has been granted a waiver of the established maximum weight limitation for dual wheel aircraft to 94,900 pounds for their charter flights to the Lanai Airport.



AIRPORT DATA	EXISTING
AIRPORT REFERENCE POINT (ARP) COORDINATES	20° 47' 19.55" N 156° 57' 15.17"
NORMAL MAX. TEMP. HOTTEST MONTH	84° F
AIRPORT ELEVATION (MSL)	1308'
AIRPORT AND TERMINAL NAVIGATIONAL AIDS	VORTAC AIRPORT BEACON LIGHT
AIRPORT CLASS	AIR CARRIER
CRITICAL AIRCRAFT	DHC-7

RUNWAY DATA (RUNWAY 3 - 21)	EXISTING	
EFFECTIVE GRADIENT (%)	0.06	
% WIND COVERAGE (15 KNOTS)	98.3	
NAVIGATIONAL AIDS	3 VASI-4	21 NONE
APPROACH SURFACES	34:1	20:1
RUNWAY LIGHTING	MIRL	
RUNWAY MARKING	NPI	
PAVEMENT STRENGTH (POUNDS)	45,000 (S) 70,000 (D) 110,00 (DT)	
ERSA (EXTENDED RUNWAY SAFETY AREA)	NO	
GROOVING	NO	
DESIGNATED INSTRUMENT R/W	RUNWAY 3	

NOTE:

THIS DRAWING IS FOR PLANNING PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION OR NAVIGATIONAL PURPOSES.

THE PREPARATION OF THIS EXHIBIT WAS FINANCED IN PART THROUGH AN AIRPORT IMPROVEMENT PROGRAM GRANT FROM THE FEDERAL AVIATION ADMINISTRATION UNDER THE PROVISION OF SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982.

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

EXISTING AIRPORT FACILITIES

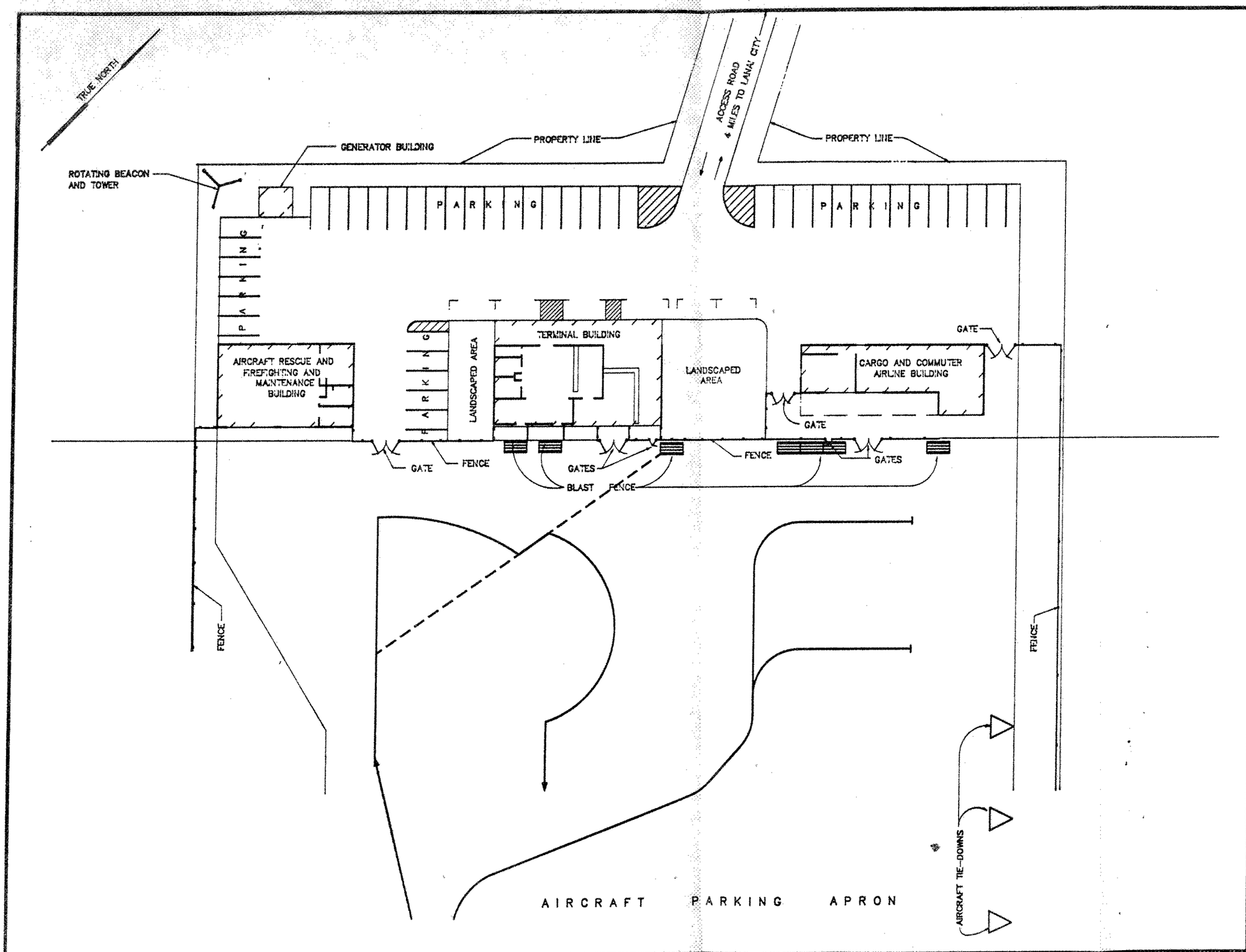
GRAPHIC SCALE IN FEET

ParEn, Inc. dba
PARK ENGINEERING

DATE:

DWG. NO.

FIGURE
2-1



Airports Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

EXISTING TERMINAL AREA PLAN

LEGEND:

BLAST FENCE

AIRCRAFT TIEDOWNS

GRAPHIC SCALE IN FEET

ParEn, Inc. dba
PARK ENGINEERING

DATE:

DWG. NO.

FIGURE 2-2

2.1.1.2 Taxiway

At present there is a single taxiway with a 75-foot width. It is an exit taxiway that connects the runway directly to the aircraft parking apron. It is aligned at 90 degrees to the runway. There is no taxiway parallel to the runway. Taxiing to the runway thresholds for take off and to the exit taxiway after landing is along the runway.

2.1.1.3 Aircraft Parking Apron

The existing aircraft parking apron is located on the east side of the terminal building. It is approximately 71,000 square feet in size and will accommodate two (2) interisland air carrier aircraft (B-737, DC-9, or DHC-7) at a time or a larger number of commuter/air taxi/air cargo aircraft (DHC-6, Cessna 402). At times there have been up to six (6) aircraft parked on the apron. (The FAA now counts the DHC-7 aircraft as commuter aircraft.)

2.1.1.4 Runway Protection Zones, Approach Areas and Obstructions

The runway protection zone (clear zone) for Runway 3 lies entirely outside the Airport property line. A portion of the runway protection zone for Runway 21 is also outside the Airport property line.

Runway protection zone dimensions are based on Federal Aviation Regulations (FAR) Part 77 approach surface dimensions out to where the surface is 50 feet above the runway threshold or 50 feet above the underlying terrain, whichever is the least distance. The inner width is determined by the most precise approach for either end of the runway. Runway 3 has a nonprecision approach requiring an inner width of 500 feet. The lengths of the protection zones are 1,700 feet for Runway 3 and 1,000 feet for Runway 21. The outer widths are 1,010 feet for Runway 3 and 700 feet for Runway 21.

Both the FAA Airport Master Record (Form 5010-1) and the Airport Obstruction Chart, published by the National Oceanic and Atmospheric Administration (NOAA), were reviewed to identify obstructions as defined by FAR Part 77, "Objects Affecting Navigable Airspace." The following tabular data shows the FAR Part 77 approach slopes, compared with existing obstacle/obstruction controlled approach slopes.

Runway		Part 77				Controlling Obstacle/Obstruction Location from Runway Threshold,
No.	Elev	Slope	Slope	Type	Elev	related to extended Runway Centerline
3	1,305	34:1	50+:1	None		Not applicable
21	1,308	20:1	34:1	Fence	1,324	790 feet along, 150 feet to the northwest of Runway Centerline

2.1.1.5 Navigational Facilities and Lighting

The Lanai VORTAC is 1.2 nautical miles (NM) from the Runway 3 threshold and provides primary navigational information for the Lanai Airport. The Airport does not have an Air Traffic Control Tower and is therefore an uncontrolled Airport. However, there is a Common Traffic Advisory Frequency (CTAF) for pilots to advise each other of their intentions and position while operating in the vicinity of the Airport. Additionally, a

Remote Communications Outlet (RCO) is located in the vicinity for communications with Honolulu Flight Service Station (FSS).

Runway 3-21 is painted with nonprecision runway markings and equipped with medium intensity runway lights (MIRL). Runway 3 has a non-precision instrument approach, with straight-in minimums. Runway 3 has a visual approach slope indicator (VASI - 4L). There is an Airport rotating beacon located west of the passenger terminal and aircraft parking apron. The Airport has a lighted wind indicator, wind cones at the ends of the runway and a segmented circle. There is also a lighted anemometer on the Airport.

2.1.2 PASSENGER TERMINAL

The Lanai Airport passenger terminal includes the aircraft parking apron, terminal building, and ancillary service facilities (see Figure 2-2). The one-level terminal building provides space for airline and passenger service facilities, terminal support facilities, and airport administrative offices. Commuter and cargo airlines also use space in the adjacent cargo building.

2.1.2.1 Air Carrier and Commuter Aircraft Parking

A 71,000 square foot aircraft parking apron serves the air carrier, commuter, cargo and general aviation aircraft. There is one aircraft parking position marked on the apron to accommodate air carrier (B-737, DC-9, or DHC-7) aircraft. In addition, there are two commuter/air taxi (DHC-6, Cessna 402) aircraft parking positions marked on the apron in front of the commuter/cargo building.

2.1.2.2 Passenger Terminal Building

Hawaiian Airlines and Aloha Island Air currently operate in the passenger terminal. Aloha Airlines also uses the terminal for their charter flights. Airline operations and passenger service facilities include airline ticketing/check-in, baggage handling, baggage claim area, and passenger waiting area. These occupy an area of approximately 2,345 square feet. Passenger services include a beverage machine, telephone and restrooms.

A security screening station is located in the terminal building near the Aloha Island Air ticketing and check-in area. Passenger security screening is currently only required for the Aloha Airlines charter flights and is actually conducted outside the building on the aircraft parking apron. There is no U.S. Department of Agriculture inspection facility at the Airport.

There are three jet blast fences on the apron side of the terminal to protect the building and people inside the terminal from the effects of jet blast.

2.1.3 CARGO FACILITIES

Hawaiian Airlines and Polynesian Airways lease space in the cargo building for their cargo operations. Aloha Island Air handles air cargo through their space in the passenger terminal. Hutchinson Air and Interisland Air provide cargo service at the Airport but do not lease any building space.

2.1.4 GENERAL AVIATION FACILITIES

There are only limited general aviation facilities at the Lanai Airport. There are 3 aircraft tiedown positions along the north edge of the aircraft parking apron. There are no hangar facilities or fixed base operator services and facilities.

2.1.5 ACCESS ROAD, PARKING AND GROUND TRANSPORTATION FACILITIES

2.1.5.1 Access Road

The Airport access road is a two-lane paved road. The condition of this road is good but the pavement is only 18 feet wide. At the present time, traffic is relatively light on both Kaumalapua Highway and the Airport access road so traffic signals or turning lanes are not required at the intersection.

2.1.5.2 Parking

Vehicular parking at the Airport consists of 35 public parking, 6 employee parking and 6 curbside parking stalls (see Figure 2-2). While there is no charge for parking, 22 of the public parking stalls have one hour parking restrictions. Overnight parking is confined to the remaining 13 public parking stalls. During peak hours, the existing public parking is inadequate and motorists must park in the dirt area to the west of the existing paved parking lot.

2.1.5.3 Ground Transportation Facilities

There are no rental car or taxi counters at the Airport. However, rental cars are available at Lanai City through Oshiro Service and U-Drive or Dollar Rent-A-Car. Oshiro also provides taxi service as does Elizabeth Fernandez, a Lanai resident.

2.1.6 AIRPORT SUPPORT FACILITIES

Airport support facilities include aircraft rescue and firefighting (ARFF), State DOT maintenance facilities, and utilities.

2.1.6.1 Aircraft Rescue and Firefighting Facilities (ARFF)

Aircraft Rescue and Firefighting (ARFF) facilities are located in Building 102 adjacent to the Terminal Building and occupy an area of 2,160 square feet. Equipment available on-site includes two firefighting trucks. There is a Quick Response vehicle with 500 gallons water and 500 pounds dry chemical and a skid mounted truck with 100 gallons premix operated by nitrogen and 450 pounds dry chemical operated by nitrogen.

2.1.6.2 Airport Support and Maintenance Facilities

Airport administrative facilities include an office in the terminal building (Building 301) and maintenance space in the ARFF/Maintenance Building (Building 102). There is also additional space in the Cargo Building (Building 101). The administrative facilities occupy a building area of 592 square feet in total.

2.1.6.3 Fuel Storage and Loading Facilities

There are no fuel storage and loading facilities at Lanai Airport. All aircraft are fueled at either Kahului or Honolulu International Airports at the present time.

2.1.6.4 Utilities

This section discusses the utility systems that serve the Airport (see Figures 2-3 and 2-4).

Water Supply. The water system for Lanai is owned and operated by the Dole Company. It consists of a domestic and an irrigation system that are interconnected through pipes and storage reservoirs. The primary sources of water for the domestic system are two tunnels and a shaft located in Maunalei Gulch.

The Airport water system is a part of the Lanai City domestic water system and extends from Lanai City to Kaumalapau Harbor along Kaumalapau Highway. The pipeline from the City to the Airport access road is a 6-inch diameter pipe while the supply line along the Airport access road is only 2-1/2 inches in diameter. The on-site water system for the Airport is shown on Figures 2-3 and 2-4.

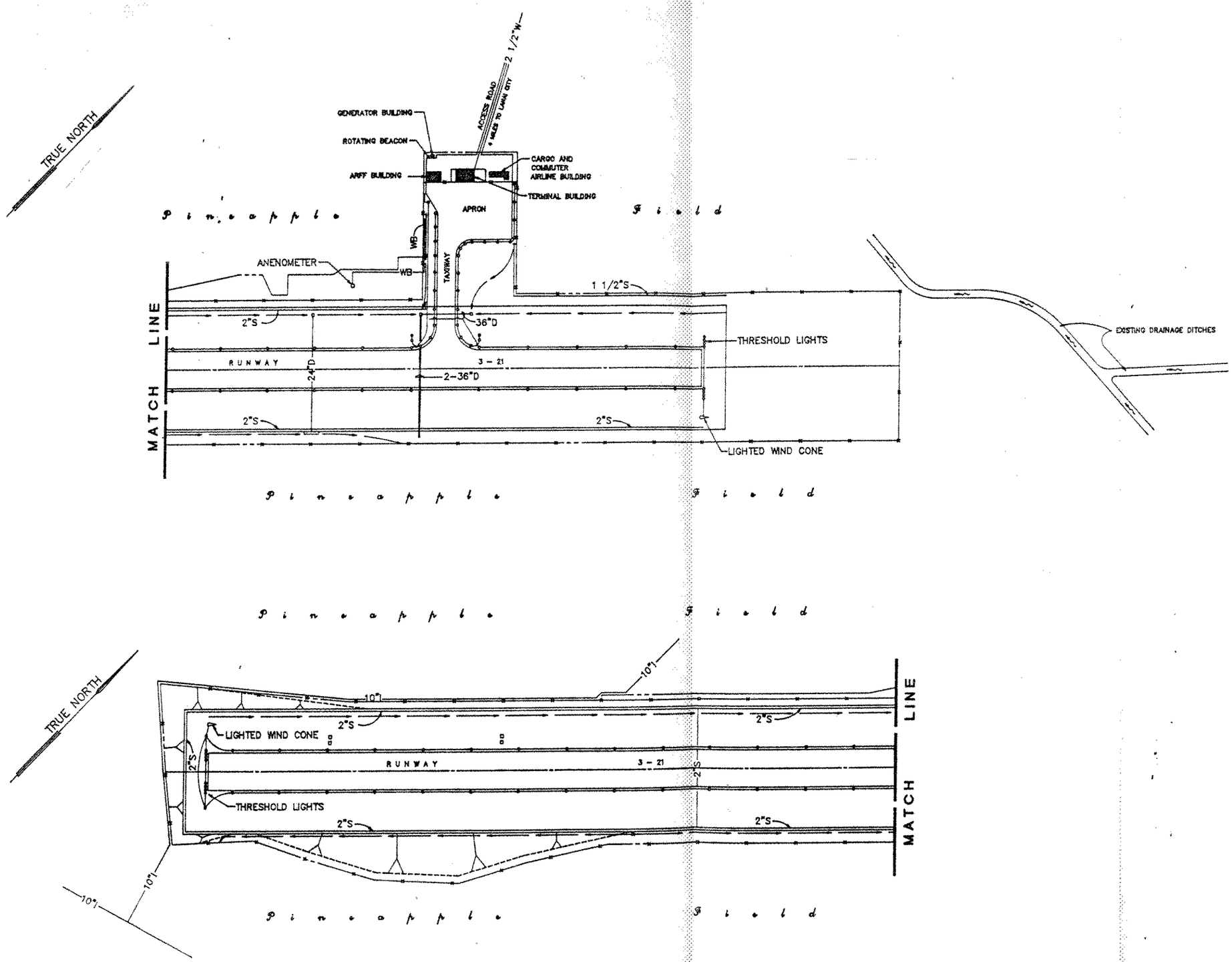
Wastewater Treatment and Disposal. At the present time, wastewater generated at the Airport is disposed of in two cesspools located on either side of the main terminal building (see Figure 2-4). The first cesspool was constructed in 1965 and the second in 1975. To date, neither one has required maintenance or pumping.

Storm Drainage. The Airport is ideally situated with respect to drainage because of its location on relatively high ground along the western rim of Miki Basin. The natural terrain of the surrounding area generally slopes away from the Airport in the easterly direction towards Kalamaiki Gulch or to the west towards Miki Basin.

The Dole Company has constructed an extensive network of drainage ditches within the central plateau to divert storm waters away from Palawai and Miki Basins. Some of the ditches near the threshold of Runway 21 lie within areas to be graded for the extension of Runway 21 (see Figure 2-3).

Electrical System. Electrical power to the Airport is provided by Maui Electric Company (MECO). Electrical service to the Airport is available via a 7,200 volt direct buried cable along the Airport access road. This cable has adequate capacity for the proposed future expansion.

At the present time, MECO is constructing a new power plant in Miki Basin (see Figure 2-5). A portion of the main distribution system between the power plant and Kaumalapau Highway (along Miki Road) has already been installed and connected to the existing Kaumalapau Highway system. Upon completion of the new power plant, the distribution lines along the Highway from Miki Road to Lanai City will be upgraded to a 12,470 volt system. The existing Kaumalapau Highway system (7,200 volt system) from Miki Road towards the harbor has adequate capacity for the future load requirements of the Airport and need not be upgraded.



Airports Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

EXISTING AIRFIELD UTILITIES

LEGEND:

- RUNWAY/TAXIWAY LIGHTS
- LIGHTED WIND CONE
- 24"D — DRAINAGE SWALE
- 10"I — IRRIGATION LINE
- 2"S — SPRINKLER LINE (ABANDONED)
- 2 1/2"W — DOMESTIC WATER LINE
- WB — WEATHER BUREAU CABLE
- FENCE

GRAPHIC SCALE IN FEET

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DATE:

DWG. NO.

FIGURE 2-3

1-28-89

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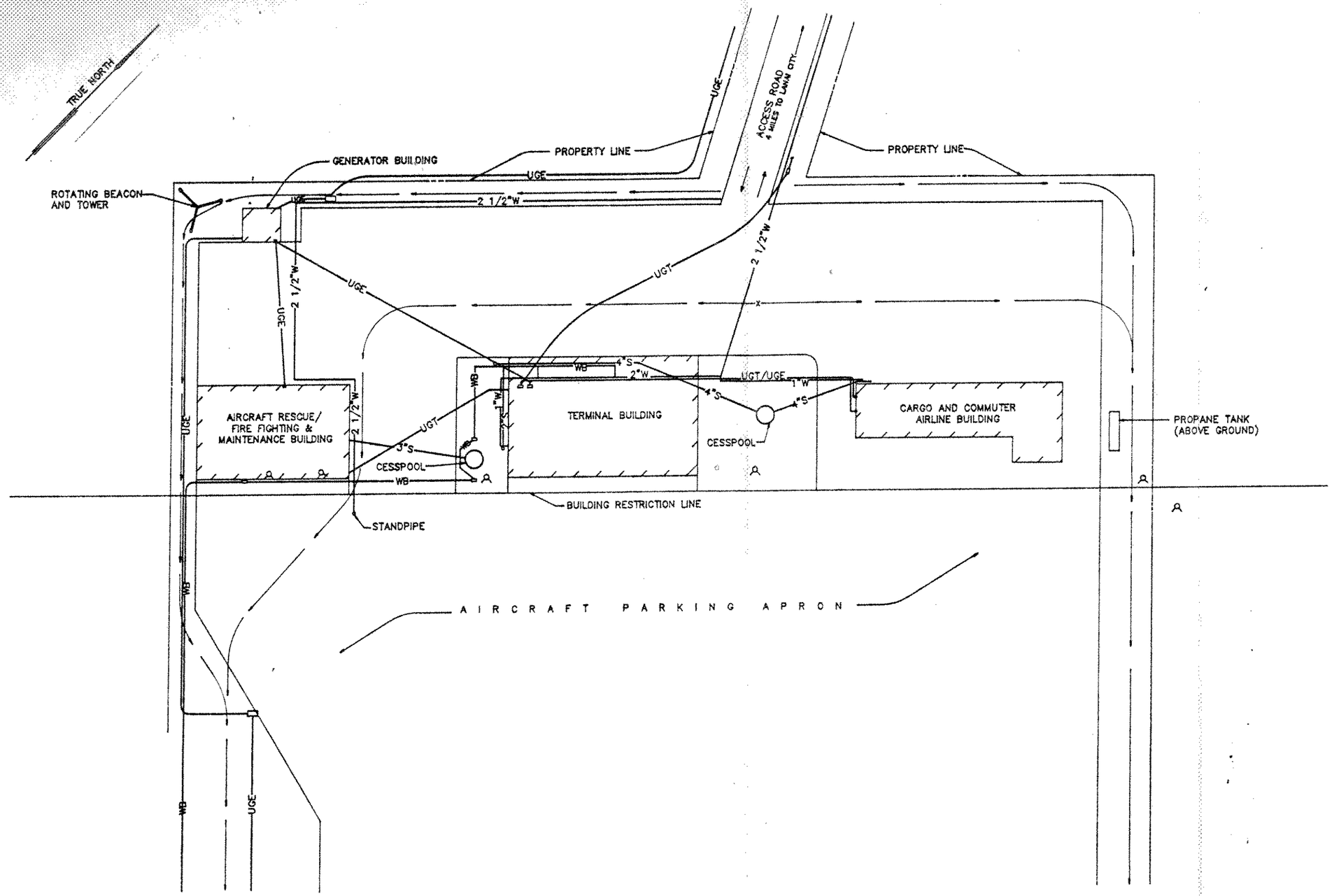

Airports Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

EXISTING TERMINAL AREA UTILITIES

LEGEND:

- DRAINAGE SWALE
- 4"S — SEWER LINE
- 2"W — WATER LINE
- UGE — UNDERGROUND ELECTRICAL LINE
- UGT — UNDERGROUND TELEPHONE LINE
- WB — WEATHER BUREAU CABLE
- FLOOD LIGHT

GRAPHIC SCALE IN FEET

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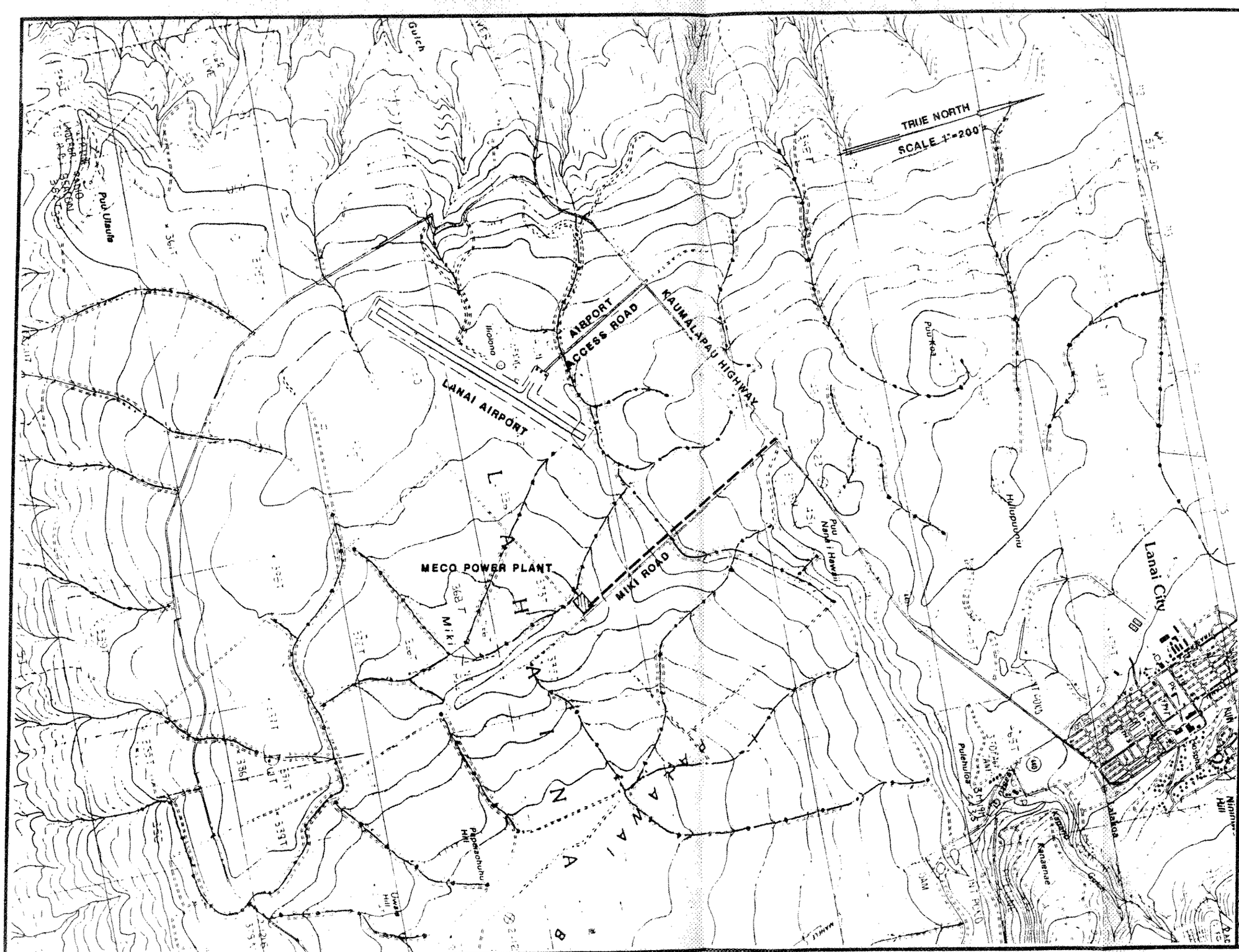
PARK ENGINEERING

DATE:

DWG. NO.

FIGURE 2-4



Airports Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

VICINITY MAP

LEGEND

—·—· DRAINAGE DITCH

— — TELEPHONE/ ELECTRIC LINE

PorEn, Inc. dba
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DATE:

DWG. NO.

FIGURE 2-5

Telephone System. The Hawaiian Telephone Company (HTCO) provides the telephone service for all of Lanai. To meet the demands of Castle & Cooke's planned developments for Lanai, HTCO is increasing and expanding its telephone facilities within Lanai City and in Miki Basin.

Telephone facilities in the immediate vicinity of the Airport consist of 25 pairs of aerial cables located along Kaumalapau Highway. Of these 25 pairs, all but one are currently in use. HTCO plans to increase the line capacity in 1990 by adding additional cables.

The telephone system at the Airport consists of 50 pairs of direct-bury underground cables installed along the access road. At the present time, the Airport uses only 14 of the available 50 pairs.

Emergency Power System. The capacity of the existing emergency power system is 25 KW. This capacity will not be adequate for the recommended Master Plan facilities.

2.2 RECOMMENDED AIRPORT MASTER PLAN

This section presents the recommended Airport Master Plan Improvements for Lanai Airport through the year 2005. The recommended year 2005 Airport Master Plan for Lanai Airport is illustrated on Figure 2-6 and the Terminal Area Plan on Figure 2-7. The Plan integrates long-term airfield and terminal area requirements with forecast aviation demand and Airport access and parking needs. It represents a guide for Airport development through the year 2005 planning period and indicates possible developments beyond the year 2005 for which land should be reserved at this time.

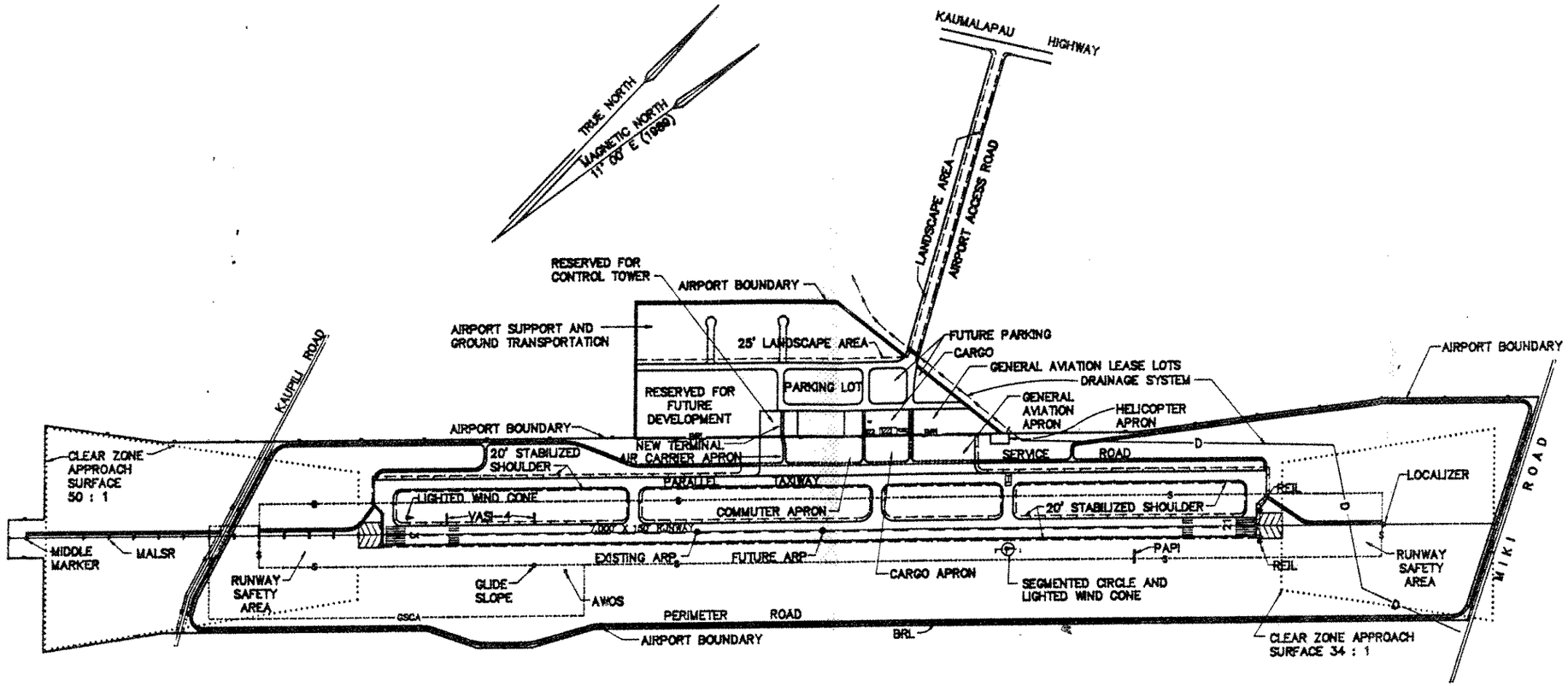
The recommended Airport Master Plan was based on the comments received on the "Alternative Airport Development Concepts." Following review by the State Department of Transportation, Airports Division, the Federal Aviation Administration, the Lanai Airport Technical Advisory Committee, and the public, the recommended concept was further developed into the detailed plans presented in this section. The recommended concept plan was presented and discussed at the Technical Advisory Committee and Public Meetings on the Lanai Airport Master Plan held by the State Department of Transportation, Airports Division in September, 1989.

2.2.1 AIRPORT LAND USE PLAN

The land use takes into account existing and planned uses for the Airport. Lands required for aviation and airport support activities are also identified. The future land use area allocations are based on the projected demands and requirements described earlier in the report.

The Airport Master Plan preserves land for potential airport expansion beyond the 2005 planning period. Land has been set aside for future runway extension, terminal area expansion, and other airport-related activities or operations. These airport land uses are detailed in the following sections.

The land use plan calls for the development of new uses and facilities, primarily in the terminal area on the northwest side of the Airport. These uses include passenger terminal, air cargo, general aviation and helicopter air taxi operations as well as support activities.



NOTE:

THIS DRAWING IS FOR PLANNING PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION OR NAVIGATIONAL PURPOSES.

THE PREPARATION OF THIS EXHIBIT WAS FINANCED IN PART THROUGH AN AIRPORT IMPROVEMENT PROGRAM GRANT FROM THE FEDERAL AVIATION ADMINISTRATION UNDER THE PROVISION OF SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982.

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

2005 AIRPORT MASTER PLAN

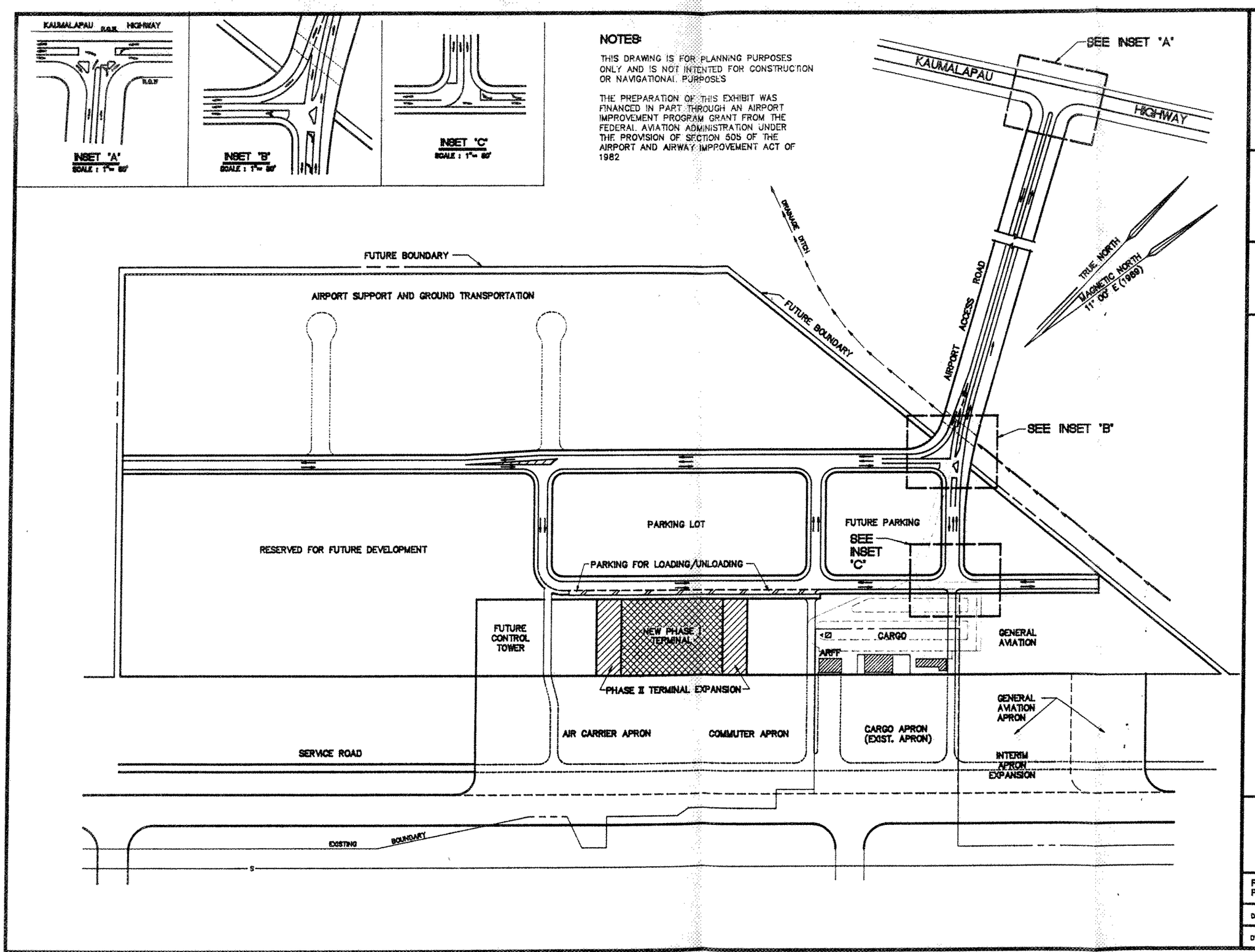
GRAPHIC SCALE IN FEET

ParEn, Inc. dba
PARK ENGINEERING

DATE:

DWG. NO.

FIGURE
2-6



Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

2005 TERMINAL AREA PLAN

GRAPHIC SCALE IN FEET

ParEn, Inc. dba
PARK ENGINEERING

DATE:

DWG. NO.

FIGURE 2-7

It is recommended that the State acquire all of the land within the recommended runway protection zones. The following runway protection zones are recommended:

Approach	Runway Standard	Runway Protection Zone Length (feet) Recommended	Minimum Required
To Runway 3	Precision Instrument	2,500	2,500
To Runway 21	Nonprecision Instrument	1,700	1,700

Privately-owned land northeast and southwest of the present Airport boundary should be acquired to accommodate the long-range extension of Runway 3-21 by 2,000 feet to the northeast from the present runway end. This should also provide for a precision instrument runway protection zone at the southwest end and a nonprecision instrument runway protection zone at the northeast end.

The Department of Transportation should acquire other land adjacent to the extended Runway 3-21 that is within the 750-foot Building Restriction Line (BRL) but outside the existing Airport boundary on both sides of the runway.

Additional privately-owned land should be acquired west of the present Airport boundary for expansion of the terminal area.

Land should be acquired on both sides of the Airport access road to provide additional right-of-way for future widening and landscaping.

2.2.2 AIRFIELD PLAN

The existing airfield can accommodate interisland (i.e., B-737 and DC-9) aircraft but with less than the maximum take off weights. One of the primary objectives of the recommended airfield improvements is to allow for unrestricted payload for interisland aircraft flights.

The existing 5,000-foot long runway can accommodate restricted interisland passenger service by forecast aircraft types. The capability for up to a 7,000-foot runway should be preserved for unrestricted interisland aircraft operations and general aviation business jet operations. A parallel taxiway and additional entry/exit taxiways are also required to expedite aircraft ground movement and reduce delay times particularly during peak operating periods.

The airfield facilities consist of the runway, taxiways, holding apron areas, shoulders, blast pads, and associated runway safety areas and protection zones. The proposed airfield improvements will satisfy the FAA Airplane Design Group III criteria for Lanai Airport. The critical aircraft (e.g., B-737, DC-9, DHC-7) requires Group III standards. The Airport is classified as a transport airport and accommodates aircraft in FAA Aircraft Approach Categories A through D (i.e., approach speeds of less than 166 knots). The proposed airfield improvements are presented below:

2.2.2.1 Runway 3-21

It is recommended that this runway be planned for an ultimate length of 7,000 feet at its present 150-foot width. The northeast end of the runway will be extended 2,000 feet to the northeast. A 1,000-foot long by 500-foot wide runway safety area should be provided beyond both ends of the extended Runway 3-21 thresholds. Because of the sloping terrain,

extensive grading work will be necessary to construct the runway extension and safety areas. The grading work, for the most part, will involve the excavation of material in the area beyond the end of Runway 21 and the placement of this material within the safety area for Runway 3.

New holding aprons are proposed on the recommended airfield plan at both ends of Runway 3-21. These holding aprons are to facilitate runway departures and are proposed primarily for use by small propeller aircraft. Holding aprons at these locations will also facilitate aircraft movement to the runways by aircraft cleared for takeoff.

2.2.2.2 Approach and Protection Areas

A precision instrument approach is planned for Runway 3. A 50:1 approach slope extends from the end of the Runway 3 primary surface out 10,000 feet (measured along the extended runway centerline). A 40:1 approach slope extends from 10,000 feet beyond the end of the runway primary surface an additional 40,000 feet. A nonprecision instrument approach is planned for Runway 21. A 34:1 approach slope extends from the end of the Runway 21 primary surface out 10,000 feet (measured along the extended runway centerline).

A nonprecision runway protection zone is currently provided on Runway 3, however, a precision instrument runway protection zone should be provided for Runway 3 in the future. A visual runway protection zone is currently provided on Runway 21. However, a nonprecision instrument runway protection zone for Runway 21 should be provided with the future extension of the runway to the northeast.

The terrain and utility poles along Miki Road penetrate the approach surface to Runway 21 and these should be removed when the runway is extended to the northeast.

2.2.2.3 Building Restriction Lines

The Building Restriction Line (BRL) is located at the recommended 750 feet on the west side of Runway 3-21 to restrict the development of structures in the area reserved for airfield facilities. It is recommended that additional land be acquired to both the east and west to provide for a 750-foot BRL along both sides of the runway within airport property.

2.2.2.4 Taxiways

The runway extension and other recommended improvements will require the development of new and extended taxiways to provide access to and from the airfield as shown on Figures 2-6 and 2-7. A full-length parallel taxiway is recommended to the west of Runway 3-21. New entry/exit taxiways will be needed to connect the extended Runway 3-21 to the parallel taxiway. A taxiway system consisting of 75-foot wide taxiways is recommended for proposed taxiway facilities serving air carrier aircraft.

2.2.2.5 Pavement Strength

The runway pavement is currently designed for a gross weight pavement strength of 70,000 pounds for dual-wheel aircraft and 110,000 pounds for dual-tandem gear configuration aircraft. The future runway extension should be designed for a gross pavement strength of 160,000 pounds for dual-wheel aircraft and 350,000 for dual-tandem gear aircraft and also for an overlay of the existing runway.

The recommended strength of all taxiways should be comparable to the proposed runway strength. The existing taxiway will require an overlay to carry the expected aircraft loads and volumes.

Further testing during the design phase will be necessary to determine the exact overlay requirement for the individual runway and taxiway overlays.

2.2.2.6 Jet Blast Protection

The primary facilities used in reducing the effects of jet blast include stabilized (paved) shoulders and blast pads. Presently, the airfield has neither stabilized shoulders nor blast pads. It is recommended that 20-foot wide stabilized shoulders be provided along

Runway 3-21 and associated taxiways. This shoulder dimension satisfies FAA Airplane Design Group III standards.

It is recommended that at least a 190-foot wide by 200-foot long blast pad be provided at the ends of extended Runway 3-21 to satisfy FAA Airplane Design Group III requirements.

2.2.2.7 Navigation and Landing Aids

A precision instrument approach (instrument landing system) is recommended for Runway 3. This will impose additional grading requirements on the land to the southwest for the glide slope critical area and to the northeast for the localizer critical area. A medium intensity approach lighting system with runway alignment indicator lights (MALSR) should also be installed.

High intensity runway lights (HIRL) are planned for both the existing runway and the future extension of Runway 3-21. Medium intensity taxiway lights (MITL) are planned for new parallel, entry/exit and other new taxiways recommended as part of the Airport Master Plan.

Distance-to-go markers should be installed from both ends of runway.

A precision approach path indicator (PAPI) and runway end identifier lights (REIL) should be planned for Runway 21.

2.2.3 TERMINAL AREA PLAN

This section presents the recommended terminal area facilities at Lanai Airport. The terminal area plan includes the passenger terminal, air cargo, commuter/air taxi, helicopter air taxi, general aviation, airport support, other airport land uses, and land reserved for future terminal area expansion. The terminal area plan reflects improvements with adequate capacity through the year 2005.

The proposed terminal area complex is laid out in a northeast-southwest linear pattern which generally follows the existing layout of the facilities west of Runway 3-21. The major expansion of the Airport terminal area is planned south of the existing passenger terminal as shown on Figures 2-6 and 2-7. The major terminal area facilities are described below.

2.2.3.1 Passenger Terminal

Passenger terminal facilities include: passenger services (ticketing, departure lounges, baggage claim, waiting area, concessions, restrooms, etc.), airline operational spaces (offices, baggage handling area, etc.), airport administration and aircraft parking apron.

Air Carrier Aircraft Parking Apron. Up to three (3) air carrier aircraft parking positions are required to accommodate the projected aircraft operations through the year 2005. Each position should be sized for operations by interisland (B-737, DC-9 and DHC-7) aircraft. Space should also be provided for at least three (3) commuter aircraft parking positions on the apron to the north of the air carriers through the 2005 planning period. The Plan will accommodate power in/power-out operations as well as other positioning of the aircraft (such as for nose-in/push-back procedures) within each aircraft parking position. Apron space is reserved on the Plan for additional air carrier and commuter aircraft parking positions beyond the 2005 planning period.

Passenger Terminal Building. A new passenger terminal building is recommended to accommodate forecast demand through the 2005 planning period. A total of 22,000 square feet is required to accommodate the passenger services (ticketing, departure lounges, baggage claim, waiting area concessions, restrooms, etc.) airline operations (offices, baggage make-up and breakdown, etc.) and airport administration facilities.

2.2.3.2 Cargo Facilities

A new cargo facility, to consolidate cargo operations, is proposed northeast of the new passenger terminal. It may be possible to use some of the existing terminal and cargo building space for several years in the general area of the existing passenger terminal facilities. The new facility will have direct access to the existing aircraft parking apron as well as to apron expansion to the northeast and southwest. Proximity of the proposed cargo facility to the proposed passenger terminal is important since much of the air cargo is expected to be transported as "belly cargo" on passenger flights. Approximately 3,000 square feet of floor space is projected as being required by the year 2005. The location of the air cargo facilities near the passenger terminal will minimize the movement of truck traffic between the cargo aircraft apron and the passenger terminal aircraft apron for those airlines handling both passengers and cargo.

Aircraft apron space for at least one (1) B-737 QC and three (3) air taxi cargo aircraft positions, planned for power-in/power-out operations is provided on the airfield side of the cargo building.

Space for truck and other vehicular parking is provided on the landside of the cargo building. A service roadway should be marked on the airfield side across the apron to connect the new air cargo facility with the new passenger terminal apron.

2.2.3.3 General Aviation

The general aviation facilities should be located away from the air carrier and cargo operations. The Master Plan provides for new general aviation facilities northeast of the passenger terminal and cargo facilities. On the basis of the general aviation forecasts it is estimated that space will be required for about 12 based and itinerant aircraft by the year 2005.

The general aviation aircraft are forecast to be a mix of small single-engine and light twin-engine aircraft of up to 12,500 pounds maximum gross take-off weight and heavier itinerant business jets. Over 150,000 square feet of apron is provided for based and itinerant aircraft parking. Some of the tiedown pavement should be constructed so that it can support itinerant general aviation aircraft of up to 160,000 pounds maximum gross take-off weight to accommodate large corporate general aviation aircraft such as the B-727.

Space for hangars is provided at the northeast end of the general aviation area. Hangar facilities could be developed to include individual executive-type hangars that could be developed as needed as well as T-hangars. Space is reserved for additional hangars if required in the future to the southwest.

Space is provided for commercial aviation/general aviation fixed-base operator lease lots northeast of the passenger terminal and cargo areas. The area has access to both the airfield and roadway system and should provide space for automobile parking for employees and visitors within each lease lot.

Space is provided at the northeast end of the general aviation area for a future aircraft wash rack.

2.2.3.4 Helicopter Air Taxi

An area is reserved for helicopter air taxi use northeast of the general aviation area. The helicopter facility includes a take-off and landing position, an apron for loading/ unloading helicopters and an area for operator operations. Each operator could have their own exclusive use loading/unloading parking positions. Each load/unload position should be at least 70 feet by 70 feet with a 50-foot separation from any buildings. Space for helicopters to hover taxi is provided between the take-off and landing position and passenger loading/unloading positions.

2.2.3.5 Airport Access and Circulation Plan

The access and circulation plan addressed in this section includes: airport access, service roads, circulation pattern, public/employee/rental car parking facilities, and apron access (see Figures 2-6 and 2-7).

Airport Access. The Airport access road will be designed to State Highway standards with two 12 feet wide traffic lanes, a landscaped median and 12 feet wide shoulders. The areas beyond the shoulders will be landscaped also. These improvements will require that additional land be acquired along the entire length of the roadway. It is recommended that a left turn lane be provided at the intersection of Kaumalapau Highway and the Airport access road for Airport bound traffic from Lanai City.

The existing access road is presently under the jurisdiction of the State Highway Division. It is recommended that this road be transferred to the State Airports Division and made a part of the Airport.

Service Roads. The service roads are designed to provide access to all master planned facilities including those areas reserved for future development.

The roadway to the new passenger terminal will be essentially a one way, two-lane wide loop road. An additional parking lane will be provided along the passenger terminal curbside for loading and unloading. An additional lane will also be provided along the north side of the parking lots when the Airport Support, Ground Transportation and/or area Reserved for Future Development are developed. At such time, traffic along this road section will become two directional.

Public Parking Facilities. By the year 2005, approximately 200 public parking spaces will be required to accommodate the projected needs of Airport users. A new parking lot to the north of the new passenger terminal is recommended.

Employee Parking Facility. A new employee parking lot is proposed as part of the new public parking lot. Parking space for airport employees should also be provided within individual lease lots and the air cargo and general aviation terminal areas.

Ground Transportation. It is recommended that part of the new public parking lot be used for rental car ready/return parking. In the passenger terminal area, the rental car ticket counter facilities could be across the curbside roadway from the passenger terminal, as at some airports, or else could be in the passenger terminal. Space is provided west of the public parking lot for a ground transportation baseyard facility, to be developed only as the demand warrants in the future.

Apron Access. Access to the apron area is provided at several locations as shown on Figure 2-7. Apron access points are proposed in the new passenger terminal, air cargo, and general aviation areas. The access points should be controlled by gates and access limited to authorized vehicles only.

2.2.3.6 Airport Support

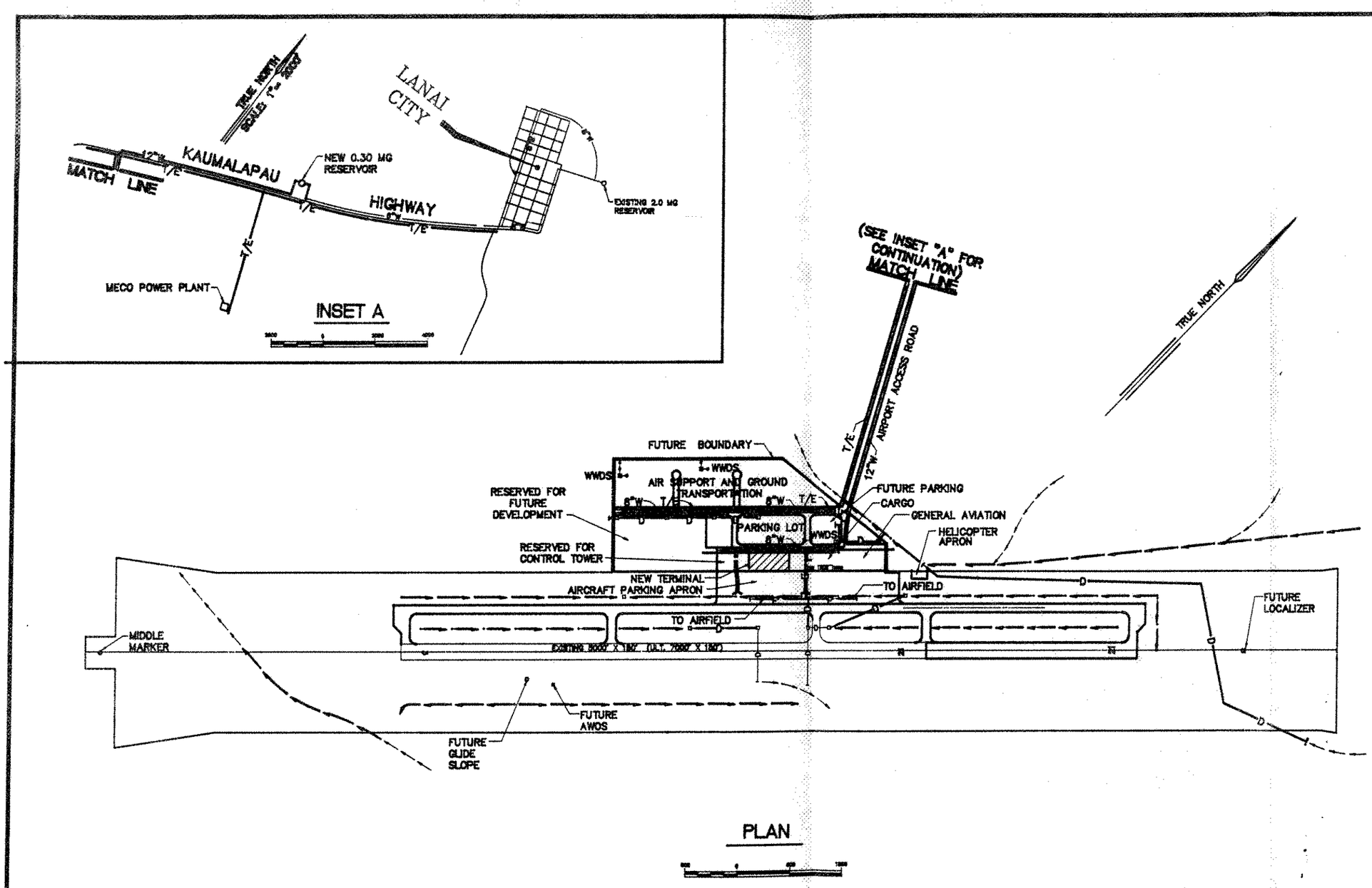
Airport support includes an Air Traffic Control Tower, aircraft rescue and firefighting (ARFF) facilities, Weather Service, State DOT maintenance facilities, fuel storage, airport service roads, and utilities. The proposed utility improvements are illustrated on Figure 2-8.

Air Traffic Control Tower. The Airport is not expected to qualify for an FAA Air Traffic Control Tower (ATCT) based on current eligibility criteria and forecast activity through the 2005 planning period. However, space is reserved for a Control Tower that could be operated by DOT or privately.

Aircraft Rescue and Firefighting (ARFF) Facility. The Aircraft Rescue and Firefighting (ARFF) Facility is retained in its present location west of Runway 3-21. A fire lane is provided in front of the ARFF facility for emergency vehicle access to the airfield.

Weather Service. An Automated Weather Observing System (AWOS-3) is recommended for installation near the glide slope facility on Runway 3 to permit FAR Parts 91, 121 and 135 flight operations without restrictions.

Fuel Storage. Space for a consolidated fuel storage area can be provided in the proposed Airport Support area west of the passenger terminal area. A minimum two-acre site should be provided.



Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

AIRPORT UTILITIES PLAN

LEGEND :

- WWDS — NEW WASTEWATER DISPOSAL SYSTEM
- 8"W — NEW WATER LINE
- D — NEW DRAIN LINE AND DRAINAGE STRUCTURE
- NEW DRAINAGE DITCH/SWALE
- 8"W — EXISTING WATER LINE
- D — EXISTING DRAIN LINE AND DRAINAGE STRUCTURE
- EXIST. DRAINAGE DITCH/SWALE
- T/E — NEW/EXISTING TELEPHONE AND ELECTRICAL LINES

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DATE:

DWG. NO.

FIGURE 2-8

State DOT Airports Maintenance Baseyard. The State DOT Airports Maintenance facility is retained in its present location. If required, space is reserved in the Master Plan for future relocation and expansion in the Airport Support area.

Perimeter/Service Roads. A perimeter road should be provided inside the Airport property. The perimeter road should extend to the northeast end of the ultimate Airport property line and along the east side of the Airport boundary, around the southwest end of Runway 3-21 and connect to the terminal area.

New perimeter fencing will be required along the expanded Airport boundary.

Water System. A storage reservoir and a larger transmission line will be required to meet the fire demand and the increase in domestic demands at the Airport.

Wastewater System. A wastewater treatment system utilizing soil absorption technology is proposed for the treatment and disposal of wastewater at Lanai Airport.

Drainage System. Some of Dole's storm water diversion ditches near the threshold of Runway 21 will be obliterated by the grading work for the runway extension. These ditches will need to be reconstructed and/or realigned.

Electrical and Telephone System. New telephone and electrical systems will be required for the proposed Master Plan facilities. The major improvements are:

- Passenger Terminal Building
- Roadway and Parking Lighting
- Airfield Lighting
- Aircraft Parking Area Lighting
- Ground Transportation Building
- ARFF Building
- Cargo Building

Emergency Power System. A new 75 KW emergency generator system will be required for the recommended Master Plan facilities.

Solid Waste Disposal. State Airport maintenance personnel will continue to collect solid waste materials generated at the Airport. Waste will be hauled to the new County landfill for disposal.

Dole Company Irrigation System. The proposed Airport expansion will encroach onto lands currently in pineapple cultivation. The irrigation lines in these areas will be removed and/or relocated. This work will be coordinated with the Dole Company.

2.3 CAPITAL IMPROVEMENT PROGRAM

The Master Plan will be implemented in a two-phase Capital Improvement Program: Phase I (1989 to 1995), and Phase II (1996 to 2005). The actual development of these facilities within each phase may vary due to funding limitations and/or administrative priorities. The estimated development costs presented are for the long-range (2005) recommended Master Plan.

The Lanai Airport Master Plan is recommended to be implemented in phases to ease the financial burden on the State, to provide a smooth transition between the phased development and to develop facilities only as the demand warrants. The Plan is recommended for development in two phases: Phase I (1989 to 1995) (see Figure 2-9) and Phase II (1996 to 2005) (see Figure 2-10).

2.3.1 PHASE I (1989-1995)

Land Acquisition. Acquire private lands northeast and southwest of Runway 3-21 for runway extension, runway protection zones and future Airport protection. Acquire private lands to the west for terminal area expansion. Acquire private land to the east for Airport protection out to the building restriction line. A total of 390 acres is to be acquired.

Airfield. Runway 3-21 will be extended by 2,000 feet to the northeast for a total length of 7,000 feet. The existing 5,000-foot runway will be overlaid and strengthened. A parallel taxiway will be built at 400 feet from the runway centerline to connect the ends of Runway 3-21 and two new entry/exit taxiways will be built. Holding aprons will be constructed at the southwest and northeast ends of the parallel taxiway. Blast pads will be constructed at the ends of Runway 3-21. Runway safety areas (1,000 feet in length and 500 feet in width) should be provided at both ends of Runway 3-21.

Navigational Aids. An Instrument Landing System (ILS) and Approach Lighting System (MALSR) will be installed on Runway 3. A Precision Approach Path Indicator (PAPI) and Runway End Identifier Lights (REIL) will be installed on Runway 21.

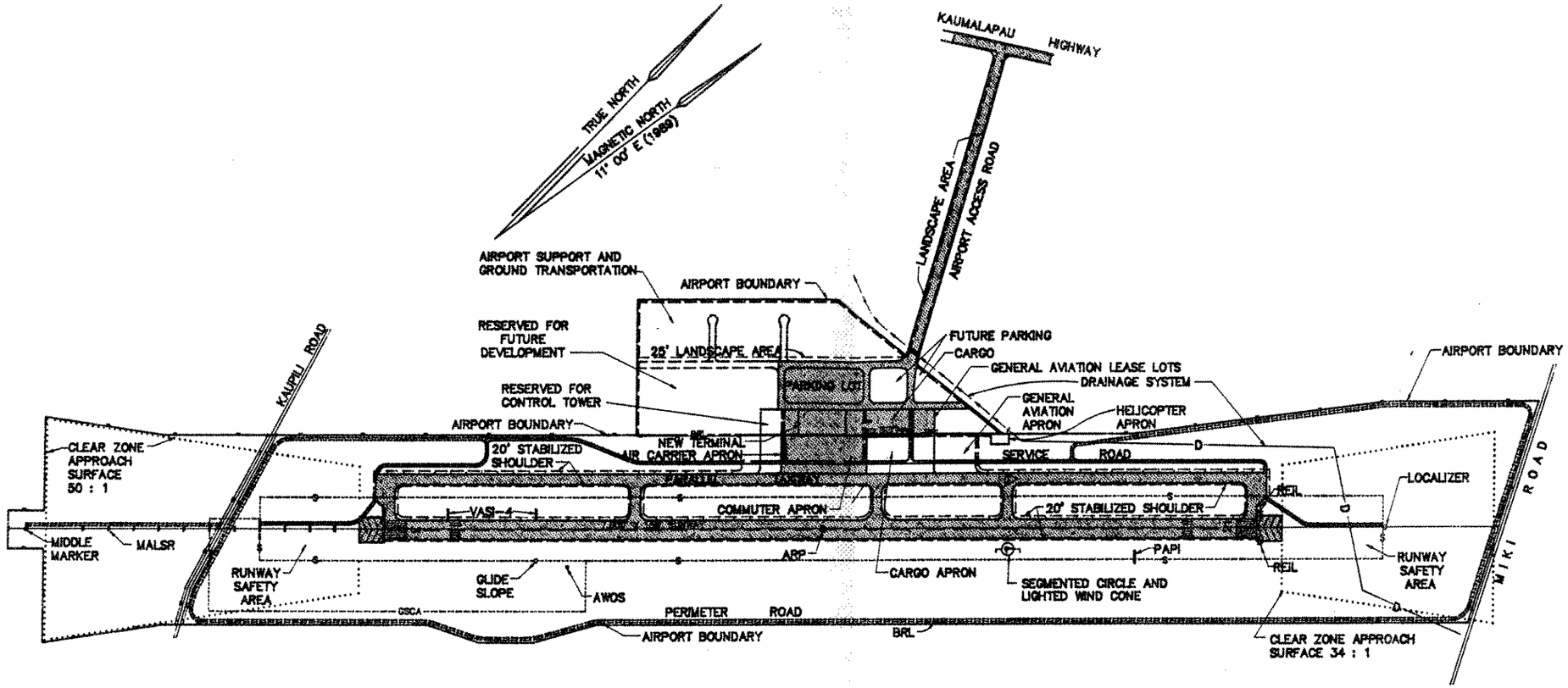
High Intensity Runway Lights (HIRL) will be installed along the runway extension as well as the existing runway. Medium Intensity Taxiway Lights (MITL) will be installed on the new and existing taxiways. An Automated Weather Observing System (AWOS) will be installed near the end of Runway 3. Distance-to-go markers will be provided on Runway 3-21. The wind cone near the end of Runway 21 will be relocated.

Terminal Area Complex. A new passenger terminal building will be constructed to accommodate both scheduled air carrier and commuter airlines. The passenger terminal aircraft parking apron will be extended at the southwest end to serve the new passenger terminal facility. A new public, employee and rental car parking lot is to be built across the curbside roadway opposite the new passenger terminal building.

A new facility to consolidate air cargo operations is proposed in the area of the old passenger terminal area. Truck and vehicular parking is provided adjacent to the air cargo building. An apron service road will connect the passenger terminal and cargo apron areas.

The old passenger terminal and cargo buildings will be demolished.

Airport Support and Infrastructure. The extension of utility systems including water, drainage, sewage, electrical and communications will be required to serve the new passenger terminal, air cargo and general aviation areas. Lighting systems are proposed for the new public access service roads and parking lots serving the passenger terminal, air cargo and general aviation areas. Lighting is also provided for the new aircraft parking apron areas.



Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

PHASE I PLAN (1995)

LEGEND:

PHASE I

GRAPHIC SCALE IN FEET

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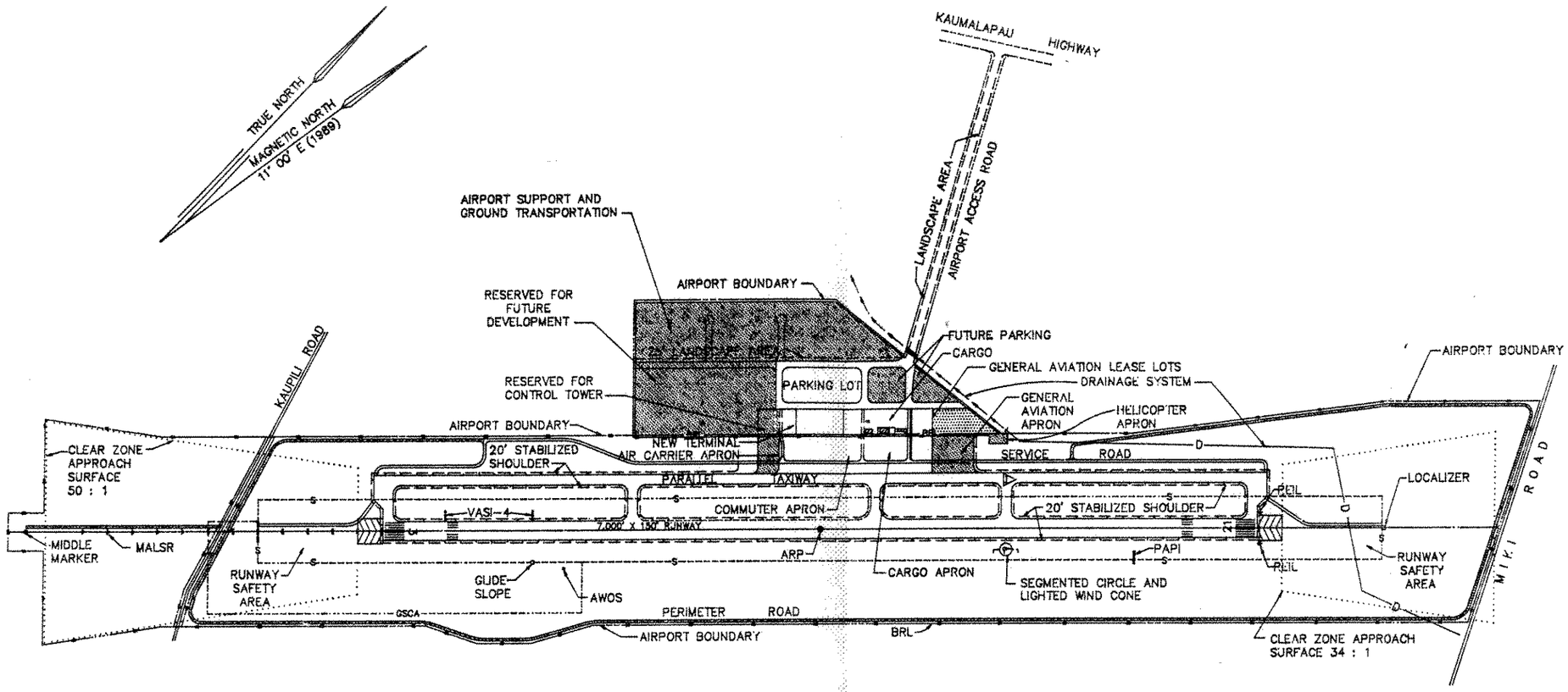
DATE:

DWG. NO.

FIGURE 2-9



Airports Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

PHASE II PLAN (2005)

LEGEND:

PHASE II

GRAPHIC SCALE IN FEET

PorEn, Inc. dba
PARK ENGINEERING

DATE:

DWG. NO.

FIGURE 2-10

New curbside access and service roads to serve the new passenger terminal, air cargo, general aviation, and Airport support areas are provided. The Airport access road off Kaumalapau Highway will be widened and landscaped. Additional landscaping will be planted in the new passenger terminal area. An airfield perimeter service road has been provided around the ends of Runway 3-21.

Installation of new perimeter fencing to conform with land acquisition is provided. New security fencing is provided between the airfield and new development in the terminal area.

2.3.2 PHASE II (1996-2005)

Terminal Area Complex. The air carrier and general aviation aircraft parking aprons will be expanded to the southwest and northeast, respectively, as the demand warrants. Additional parking spaces will be provided in the public, rental car and employee parking lot, if required.

A new helicopter air taxi facility including a landing and take-off position as well as passenger loading/unloading positions, will be developed northeast of the general aviation area, as the demand warrants.

Airport Support and Infrastructure. The perimeter road will be extended around the east side of the Airport to provide access around the airfield inside the Airport boundary.

The apron lighting system will be extended for the air carrier and general aviation aircraft parking apron extensions as necessary.
New Airport support and ground transportation areas will be developed. The service road through the Airport support and future development areas will be extended to serve new development, as required.

The DOT Airport Maintenance facility will be relocated to the new Airport support area if required. A fuel farm, if required, will be developed in the Airport support area. An aircraft wash rack will be provided at the northeast end of the general aviation area, if required.

2.3.3 CAPITAL IMPROVEMENT PROGRAM COST ESTIMATE

A summary of costs for each of the development phases is presented in Table 2-1. The major cost items have been identified by type of facility. All costs are in terms of 1989 dollars. The cost estimate assumes the additional land that will be required will be donated by Castle & Cooke, Inc.

2.4 RATIONALE FOR PROPOSED ACTION

The recommended plan for expansion of the airfield facilities was developed to accommodate forecast aviation demands and allow unrestricted interisland and general aviation aircraft operations. The present airfield facilities restrict the aircraft take-off and landing weights for both interisland air carrier jet aircraft and general aviation business jets because of the inadequate runway length and pavement strength. The expanded airfield facilities will provide enhanced operational capabilities for interisland air carrier and general aviation operations.

Table 2-1

CAPITAL IMPROVEMENT PROGRAM COST ESTIMATES
Lanai Airport
1989-2005

Project Description		Estimated Costs
PHASE I (1989-1995)		
Land Acquisition		$ -0-
Airfield		29,237,000
Navigational Aids		3,260,000
Terminal Area Complex		4,560,000
Airport Support and Infrastructure		8,753,000
	Subtotal	$45,810,000
PHASE II (1996-2000)		
Terminal Area Complex		$ 2,420,000
Airport Support and Infrastructure		2,110,000
	Subtotal	$ 4,530,000
CAPITAL IMPROVEMENT PROGRAM TOTAL		$50,340,000

Long-range expansion capability and flexibility guided development of the recommended terminal area plan. The recommended terminal area plan separates terminal facilities for passenger, cargo, general aviation and helicopter air taxi facilities. This layout minimizes the mix of different size aircraft on the apron. Location of most of the facilities is in areas that will allow for future expansion beyond the 20-year planning period. The Master Plan continues to utilize most of the existing facilities and minimize operational disruptions during construction.

These new and expanded terminal area facilities will be accessed by a new roadway system off the Airport access road that includes a one-way loop roadway along the passenger terminal curbside and new service roads to other areas of the Airport. Traffic to the passenger terminal is separated as much as practical from traffic to other areas of the Airport such as air cargo and general aviation. A wider and landscaped access road connects the Airport to Kaumalapau Highway. A new parking lot is provided for passengers, rental cars and employees.

2.5 PERMITS AND APPROVALS

The following permits and approvals are required prior to implementation of the project:

AUTHORITY	APPROVAL REQUIRED
Federal Government	
Federal Aviation Administration	Approval of the Airport Layout Plan
State of Hawaii	
Governor	Environmental Impact Statement
State Land Use Commission	Change in Land Use from Agriculture to Urban
Department of Health	On-site Wastewater Disposal System
Department of Transportation, Highways	Construction within State Right-of-Way
County of Maui	
Planning Department	Lanai Community Plan Amendment Rezoning
Department of Public Works	Grading Permit
Building Department	Building Permit

2.6 ALTERNATIVE AIRPORT DEVELOPMENT CONCEPTS

Alternative airport development concepts were considered for the long-range development of the Lanai Airport. The alternative concepts were initially presented to the Technical Advisory Committee and the public at meetings on February 22, 1989. The refined alternative concepts were also presented to the Technical Advisory Committee and the public at meetings on May 24, 1989.

2.6.1 FORMULATION OF ALTERNATIVE AIRPORT DEVELOPMENT CONCEPTS

Several airport development concepts were formulated and evaluated for review prior to the selection of the recommended long-range Airport Master Plan. Airport Alternative Development Concepts 1, 2, 3, and 4 are described below.

The recommended Airport Master Plan concept described above is based on the comments and suggestions received as a result of State, DOT, FAA, Technical Advisory Committee, airport users and public review and comments.

2.6.2 DESCRIPTION OF ALTERNATIVE AIRPORT CONCEPTS

A summary of the principal features of each alternative is presented below together with their estimated cost.

2.6.2.1 Alternative 1 - Extend Existing Ruwnay 3-21 to 6,000 Feet

This concept involves extending Runway 3-21 to 6,000 feet by adding a 1,000-foot extension to the northeast. New passenger terminal, cargo, general aviation, roadway and parking, and utility and support facilities are provided. This concept is illustrated on Figure 2-11.

Land Acquisition

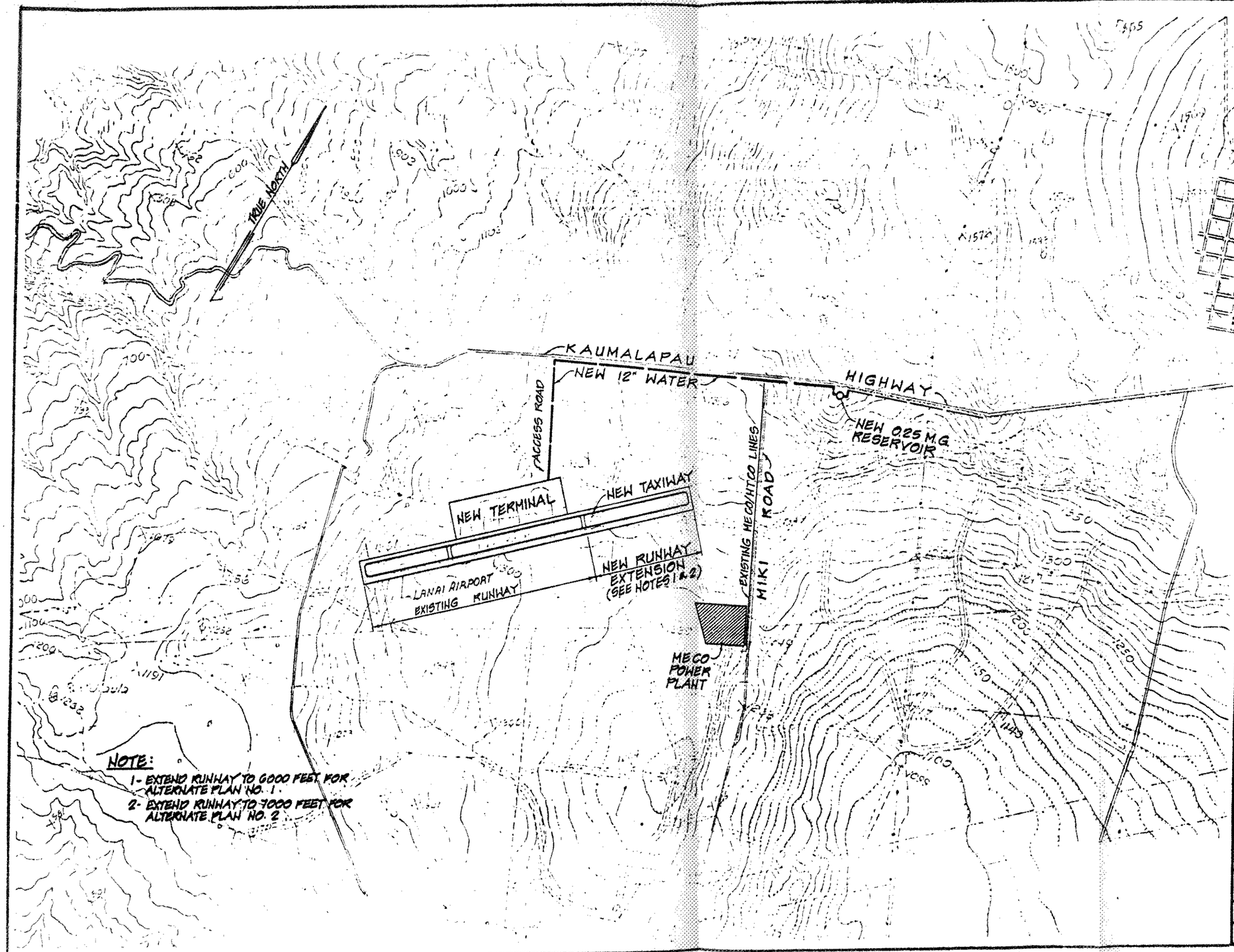
- Acquire 310 acres for runway extension, approach and clear zone protection and terminal area expansion

Airfield

- The mass grading involves approximately 2.0 million cubic yards of excavation and 1.5 million cubic yards of embankment
- Crosswind coverage is 98.3 percent for 15 knots and 93.8 percent for 10.5 knots for the existing runway
- Extend Runway 3-21 by 1,000 feet to the northeast
- Provide parallel taxiway and entry/exit taxiways
- Strengthen existing 5,000-foot runway
- The existing aircraft parking apron is extended to the south and north for additional air carrier, commuter, cargo and general aviation aircraft parking
- Plan for an Instrument Landing System (ILS) on Runway 3
- Install an Automated Weather Observation System (AWOS)

Terminal Area

- A new passenger terminal is provided to the north of the existing cargo building



Airports Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT
MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AP PROJECT NO.

ALTERNATIVE PLANS NOS. 1 & 2

SITE PLAN AND OFF-SITE IMPROVEMENTS

GRAPHIC SCALE IN FEET

200 0 200 400

ParEn, Inc. dba
PARK ENGINEERING

DATE	FIGURE
DWG. NO.	2-11

- Additional space is provided for cargo building(s) in the present terminal area. Space for general aviation facilities (aircraft parking apron, fixed base operator lease lots, etc.) is provided south of the ARFF facility

- A new parking lot is provided

- Space is reserved for future ground transportation and airport support needs

Utilities

- A channelized drainage system is required under the extended airfield

- The drainage, water, sewer and other utilities are upgraded

Off-site Improvements

- The existing access road is widened and improved between Kaumalapau Highway and the terminal area

- A water transmission line and reservoir are required

Preliminary Cost Estimates

- The preliminary cost estimate for Alternative 1 is $49,290,000

2.6.2.2 Alternative 2 - Extend Existing Runway 3-21 to 7,000 Feet

This concept involves extending Runway 3-21 to 7,000 feet by adding a 2,000-foot extension to the northeast. New passenger terminal, cargo, general aviation, roadway and parking, and infrastructure facilities are provided. This concept is illustrated on Figure 2-11.

Land Acquisition

- Acquire 340 acres for runway extension, approach and clear zone protection and terminal area expansion

Airfield

- The mass grading involves approximately 2.3 million cubic yards of excavation and 1.7 million cubic yards of embankment

- Crosswind coverage is 98.3 percent for 15 knots and 93.8 percent for 10.5 knots for the existing runway

- Extend Runway 3-21 by 2,000 feet to the northeast

- Provide parallel taxiway and entry/exit taxiways

- Strengthen existing 5,000-foot runway

- The existing aircraft parking apron is extended to the south and north for additional air carrier, commuter, cargo and general aviation parking
- Plan for an Instrument Landing System (ILS) on Runway 3
- Install an Automated Weather Observation System (AWOS)

Terminal Area

- A new passenger terminal is provided to the south of the ARFF facility
- Additional space is provided for cargo building(s) in the present terminal area. Space for general aviation facilities (aircraft parking apron, fixed base operator lease lots, etc.) is provided north of the existing cargo building
- A new parking lot is provided
- Space is reserved for future ground transportation and airport support needs

Utilities

- A channelized drainage system is required under the extended airfield
- The drainage, water, sewer and other utilities are upgraded

Off-site Improvements

- The existing access road is widened and improved between Kaumalapau Highway and the terminal area
- A water transmission line and reservoir are required

Preliminary Cost Estimates

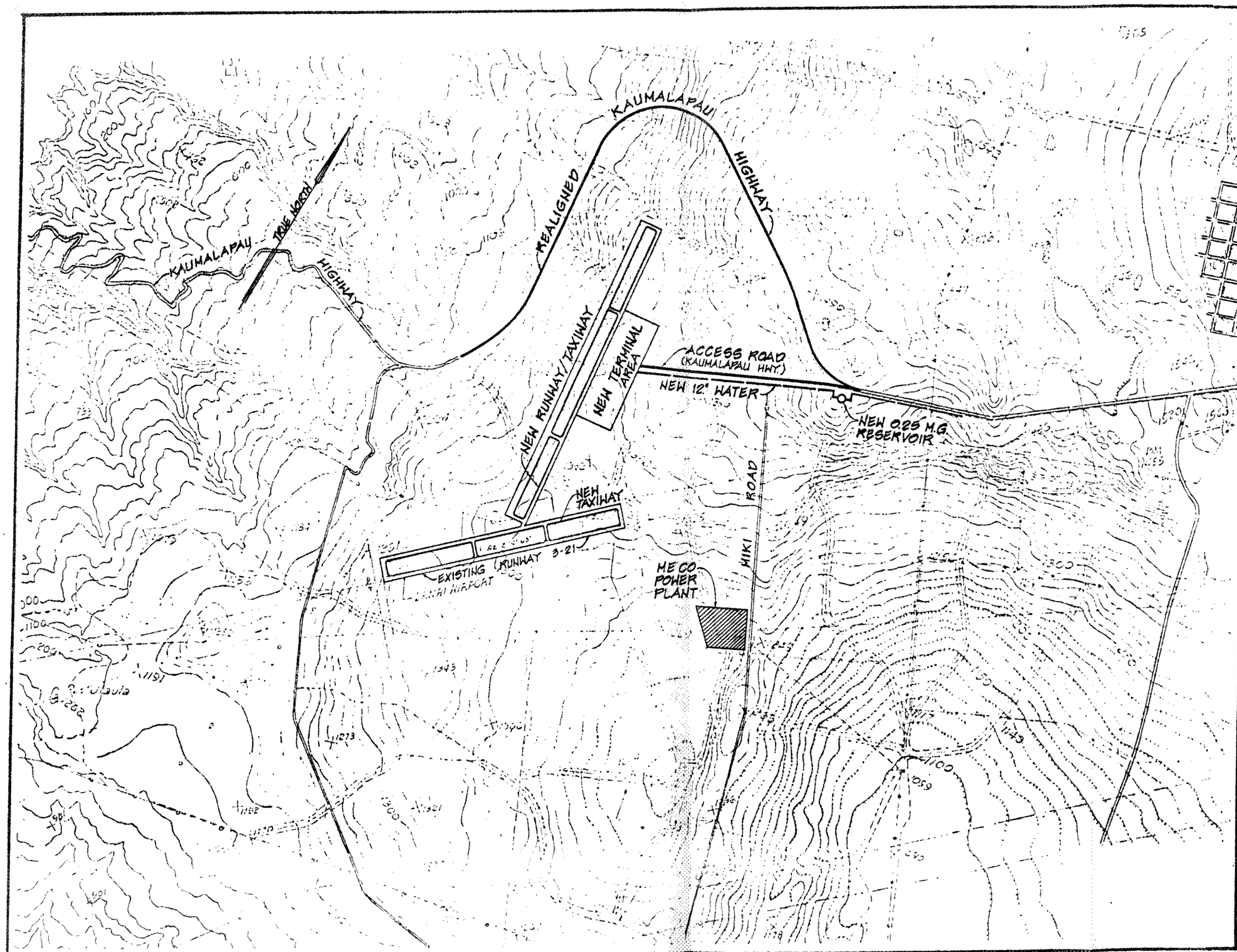
- The preliminary cost estimate for Alternative 2 is $55,184,000

2.6.2.3 Alternative 3 - Build New 7,000-Foot Runway to North

This concept involves building a new 7,000-foot runway to the north of the present Airport. New passenger terminal, cargo, general aviation, access roadway and parking, and infrastructure facilities are provided. The new runway and taxiways are connected to the existing Runway 3-21 which is retained at 5,000 feet. The existing terminal area facilities are either relocated or demolished. This concept is illustrated on Figure 2-12.

Land Acquisition

- Acquire 430 acres to the north for the new runway, approach and clear zone protection and new terminal area



Airports Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

ALTERNATIVE PLAN NO.3

SITE PLAN AND OFF-SITE IMPROVEMENTS

GRAPHIC SCALE IN FEET

200 0 200 400

PacEn, Inc. dba
PARK ENGINEERING

DATE:

DWG. NO.

FIGURE
2-12

Airfield

- The mass grading involves approximately 8.3 million cubic yards of excavation and 2.0 million cubic yards of embankment
- Crosswind coverage is 94.9 percent for 15 knots and 81.2 percent for 10.5 knots for the new runway alignment
- Construct new 7,000-foot runway to the north
- Strengthen the existing 5,000-foot runway
- Provide parallel taxiway and entry/exit taxiways for both runways
- Construct a new aircraft parking apron for air carrier, commuter, cargo and general aviation
- Plan for an Instrument Landing System (ILS) on the new runway
- Relocate the VORTAC and airport rotating beacon
- Install a new precision approach path indicator (PAPI) and runway end identifier lights (REIL)
- Install an Automated Weather Observation System (AWOS)

Terminal Area

- New passenger terminal, cargo and ARFF/maintenance buildings are required
- The existing passenger terminal, cargo and ARFF/maintenance buildings are removed
- A new access road and parking lot are required
- Space is reserved for future ground transportation and airport support needs

Utilities

- A channelized drainage system is required under the new runway and taxiways
- New drainage, water, sewer and other utilities are upgraded

Off-site Improvements

- Kaumalapau Highway and utilities are relocated
- A water transmission line and reservoir are required

Preliminary Cost Estimates

- The preliminary cost estimate for Alternative 3 is $134,067,000

2.6.2.4 Alternative 4 - Build New 7,000-Foot Runway to South

This concept involves building a new 7,000-foot runway to the south of the present Airport. New passenger terminal, cargo, general aviation, access roadway and parking, and infrastructure facilities are provided. The new runway and taxiways are connected to the existing Runway 3-21 which is retained at 5,000 feet. The existing terminal area facilities are either relocated or demolished. This concept is illustrated on Figure 2-13.

Land Acquisition

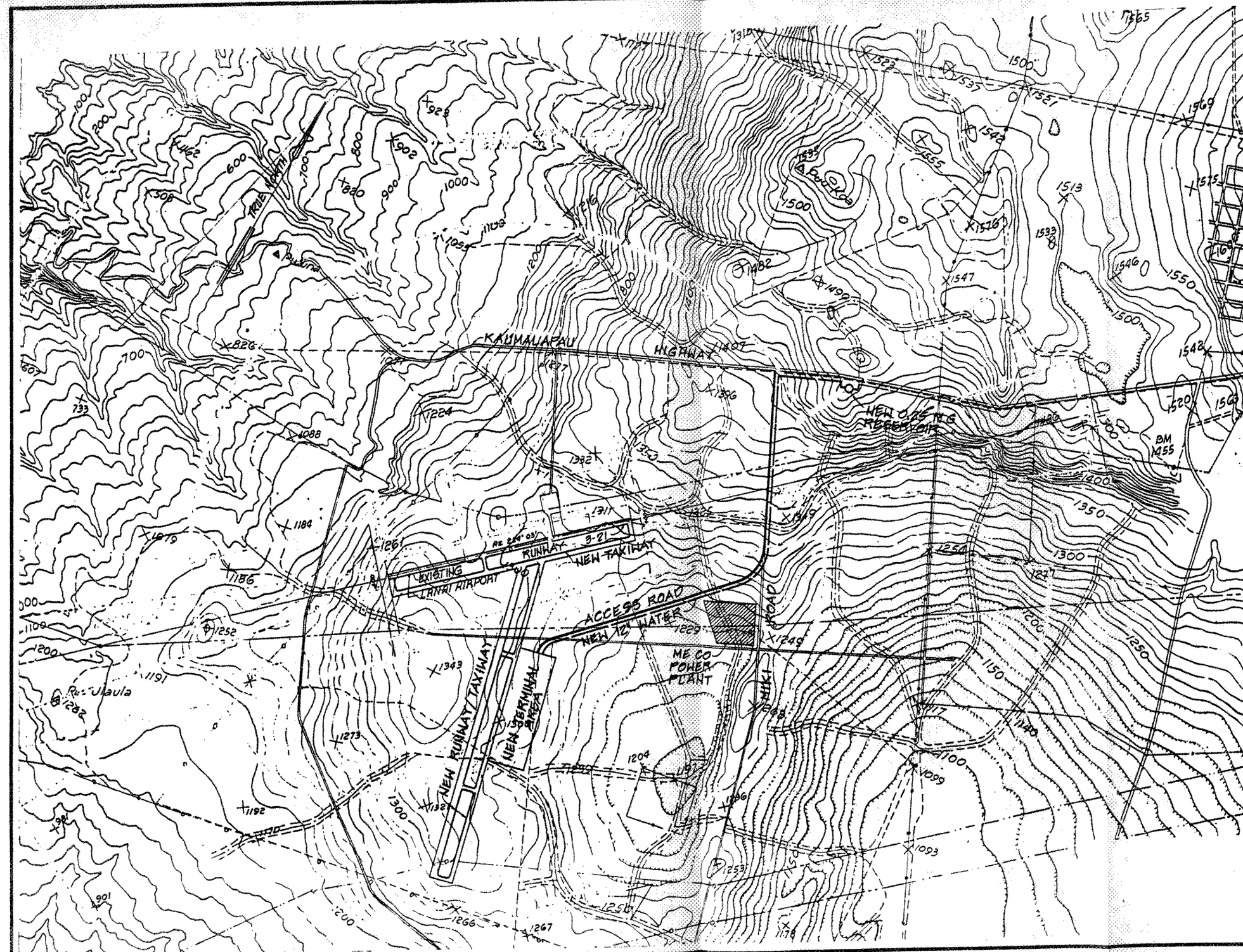
- Acquire 430 acres to the south for the new runway, approach and clear zone protection and new terminal area

Airfield

- The mass grading involves approximately 2.4 million cubic yards of excavation and 1.8 million cubic yards of embankment
- Crosswind coverage is 89.3 percent for 15 knots and 77.4 percent for 10.5 knots for the new runway alignment
- Construct a new 7,000-foot runway to the south
- Strengthen the existing 5,000-foot runway
- Provide parallel taxiway and entry/exit taxiways for both runways
- Construct a new aircraft parking apron for air carrier, commuter, cargo and general aviation
- Plan for an Instrument Landing System (ILS) on the new runway
- Relocate the VORTAC and airport rotating beacon
- Install a new precision approach path indicator (PAPI) and runway end identifier lights (REIL)
- Install an Automated Weather Observation System (AWOS)

Terminal Area

- New passenger terminal, cargo and ARFF/maintenance buildings are required
- The existing passenger terminal, cargo and ARFF/maintenance buildings are removed
- A new access road and parking lot are required
- Space is reserved for future ground transportation and airport support needs



Airports Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

ALTERNATIVE PLAN NO.4

SITE PLAN AND OFF-SITE IMPROVEMENTS

GRAPHIC SCALE IN FEET

200 0 200 400

ParEn, Inc. dba
PARK ENGINEERING

DATE:

DWG. NO.

FIGURE
2-13

Utilities

- o A channelized drainage system is required under the new runway and taxiways
- o New drainage, water, sewer and other utilities are upgraded

Off-site Improvements

- o A new access road is required from Kaumalapau Highway to the new terminal area
- o A water transmission line and reservoir are required

Preliminary Cost Estimates

- o The preliminary cost estimate for Alternative 4 is $73,201,000

2.7 "NO ACTION" ALTERNATIVE

The airfield and terminal area facilities are inadequate to accommodate present operations. Therefore, if the planned expansion is not implemented, the present facilities will not be able to accommodate the projected forecasts and requirements. Growth of the Island of Lanai will be indirectly affected if the Airport facilities are not expanded.

The existing passenger terminal facilities are inadequate. Presently, there are two interisland air carriers and commuters operating in the terminal and the third operated until recently from limited space in the cargo building. Security screening for the Aloha Airlines charter flights is conducted on the aircraft parking apron. The restrooms are only available at those times when Hawaiian Airlines is operating. There are limited passenger services in the terminal.

The existing airfield facilities are inadequate to handle the interisland air carrier aircraft without weight restrictions.

The existing aircraft parking apron is not adequate and often congested with a mix of large and small aircraft (e.g., B-737 and Cessna 402). This creates operational and safety concerns for both the passenger and cargo operators.

Part of the cargo building is currently being used for other purposes, e.g., commuter terminal and maintenance and storage space. Cargo is sometimes left out in the open due to the lack of building space.

There is inadequate automobile parking for the current level of activity and overflow parking occurs in the adjacent pineapple fields off the Airport. In addition, there is congestion at the terminal building curbside due to the present layout and inadequacy of the roadway and parking system. The Airport access road off Kaumalapau Highway is also of substandard width.

SECTION 3

SECTION 3

IMPACTS ON THE PHYSICAL ENVIRONMENT

This section describes the impacts on the physical environment. Impacts and mitigation measures are also described.

3.1 GEOGRAPHY AND CLIMATE

The climate on Lanai is generally mild with fairly uniform temperatures throughout the year. The predominant winds are the tradewinds from the east-northeast that blow at wind velocities of from 10 to 18 miles per hour. Since a large part of Lanai is at a fairly high elevation (1,000 feet or more above mean sea level), the average temperatures on the Island are cooler than for most of the other Islands. The average temperature for Lanai City is 68 degrees Fahrenheit with a high of 73 degrees Fahrenheit during the summer months and a low of 66 degrees Fahrenheit in the winter.

The rainfall on Lanai is relatively low due to the shielding effects of the rain-producing tradewinds by the Islands of Maui and Molokai. The highest rainfall occurs in the upper elevation around Lanaihale where the annual average rainfall is about 35 inches. The lowest rainfall occurs along the coastal regions with an average rainfall of 10 inches. The average rainfall at the Airport is 20 inches. The wettest and driest months of the year are from November through March and from May through August, respectively.

A. Impacts

No significant changes to the climate in the vicinity of the Airport are anticipated as a result of the project.

B. Mitigation Measures

None required.

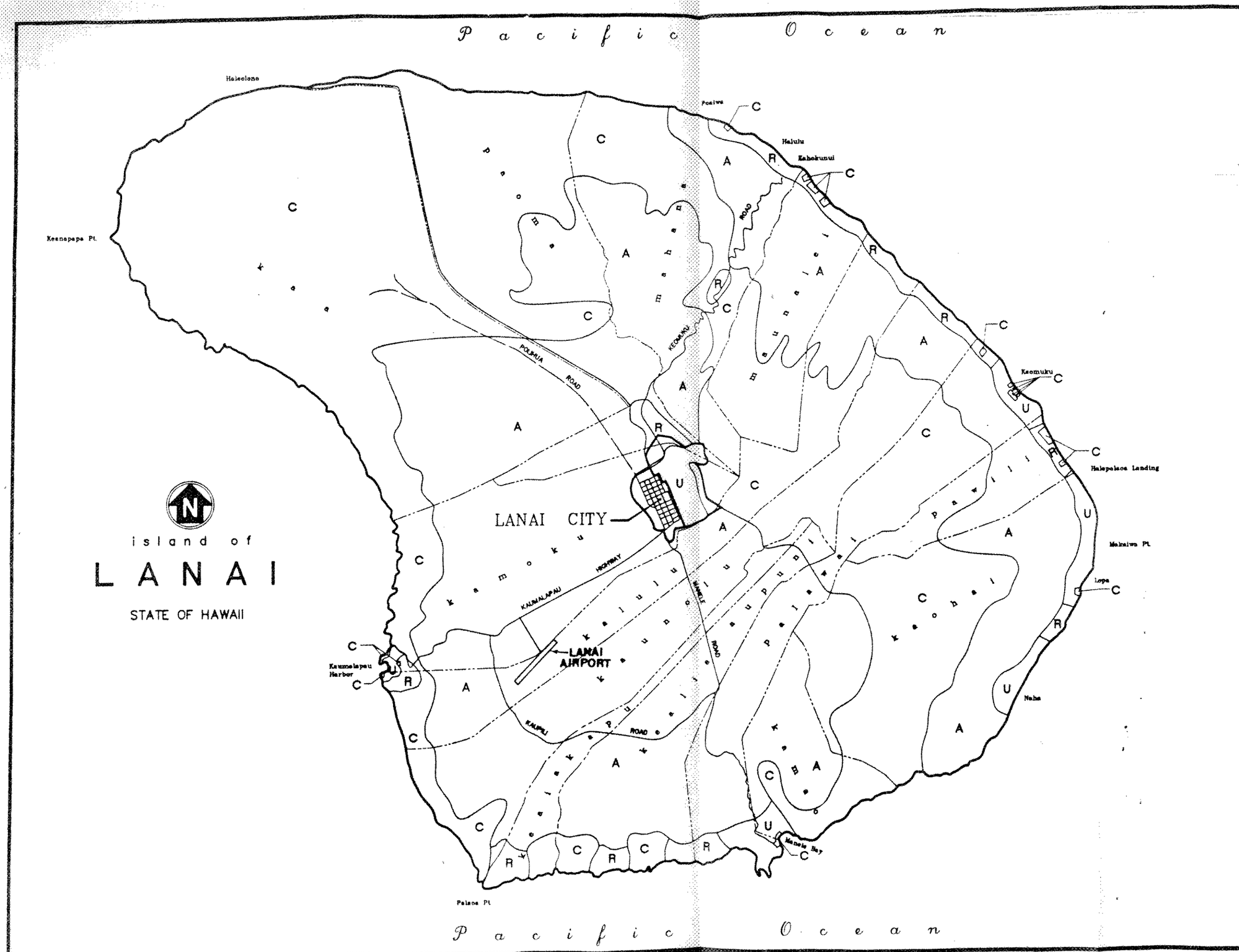
3.2 LAND OWNERSHIP AND LAND USE PLANS

3.2.1 OWNERSHIP

Lanai Airport is located on land owned by the State of Hawaii in the ahupuaa (district) of Kalulu. The total land area within the existing Airport is approximately 93 acres. All of the land surrounding the Airport is owned by Castle & Cooke, Inc. The additional land required for expansion of the Airport will have to be acquired by the State from Castle & Cooke, Inc.

3.2.2 STATE LAND USE

The State Land Use Map for the Island of Lanai is shown in Figure 3-1. As indicated, Lanai Airport and all of the surrounding lands are designated State Agricultural.



Airports Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

STATE LAND USE DISTRICT MAP

LEGEND:

- C CONSERVATION
- A AGRICULTURAL
- U URBAN
- R RURAL

GRAPHIC SCALE IN FEET

4000 0 4000 8000

ParEn, Inc. dba
PARK ENGINEERING

DATE:

DWG. NO.

FIGURE 3-1

3.2.3 LANAI COMMUNITY PLAN

The Lanai Community Plan (LCP) was mandated by the 1977 Charter of Maui County (see Figure 3-2). Its purpose is to provide the detailed scheme for implementing the broad and long-range objectives/policies of the County General Plan for the Island of Lanai. It is intended to serve as a guide in the decision making process for developments on Lanai until the year 2000. The Plan elements are organized according to the General Plan objectives and policies.

Two of the major elements of the LCP are the Project District Developments at Manele and Koele. The Project District concept provides for a flexible and creative planning approach rather than specific land use designations.

3.2.4 COUNTY ZONING AND EXISTING LAND USE

At the present time, the County of Maui does not have a Zoning Map for the Island of Lanai and the provisions of the County Interim Zoning Code do not apply. All land use matters relating to the Airport are therefore governed by rules and requirements of the State Land Use Commission.

As indicated in Figure 3-2, all of the lands around the Airport are in agricultural use. The closest urbanized areas are Lanai City located 3 miles to the northeast and Kaumalapau Harbor located 3 miles due west. Currently, new resort hotels are under construction at Manele Bay and Koele as well as new residential developments within Lanai City. Noise sensitive land uses such as schools, hospital and library are all located in Lanai City.

A. Impacts

The proposed Airport improvements will place additional land into uses that do not conform to the current State and County land use plans. The airport expansion and improvements will also remove some land from agricultural production.

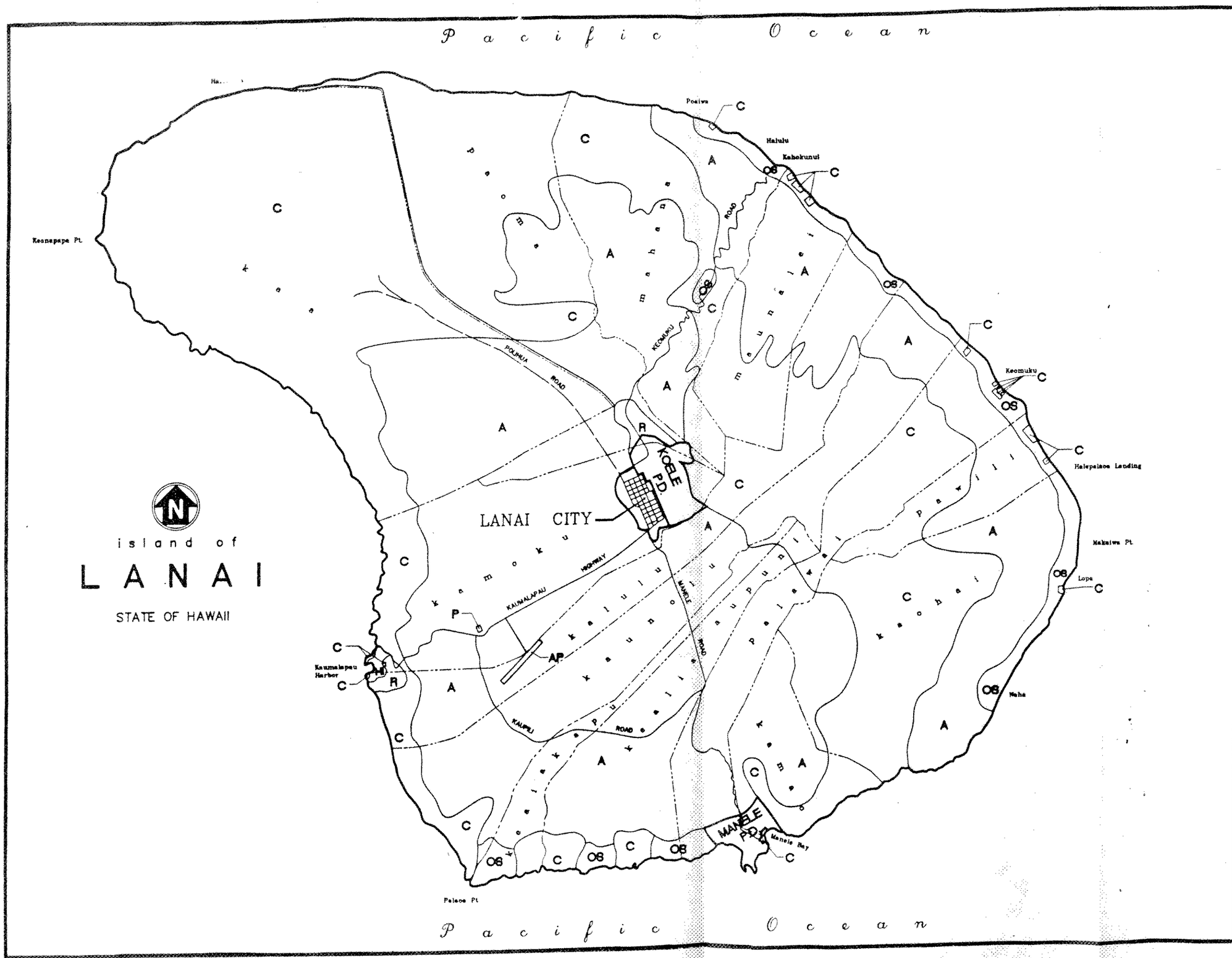
B. Mitigation Measures

A Boundary Amendment will be requested from the State Land Use Commission. The Lanai Community Plan will be amended to reflect the recommended Airport boundary.

3.3 NATURAL HAZARDS

The project site, atop a flat ridge with naturally sloping terrain on two sides, minimizes the flood hazard potential from off-site storm water flows. Existing storm drainage systems (on-site by the Airport and off-site by the Dole Company) further mitigate potential storm drainage problems.

The 1985 Uniform Building Code rates potential damages to structures from seismic activities by zones on a scale of 0 to 4 ("0" being "No Damage"). The entire Island of Lanai is situated within Seismic Zone 1.



Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT
MASTER PLAN
ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

LANAI
COMMUNITY
PLAN

PorEn, Inc. dba
PARK ENGINEERING

DATE:
DWG. NO.

FIGURE
3-2

A. Impacts

Some of Dole's off-site drainage ditches will be obliterated by the grading work required for the runway extension.

B. Mitigation Measures

Drainage ditches that are affected by grading operations will be reconstructed and or realigned. All structures will be designed to conform to the Uniform Building Code regulations for the Seismic Zone 1 risk category.

3.4 FLORA AND FAUNA

According to the U.S. Department of the Interior, Fish and Wildlife Service, Pacific Islands Office no listed threatened or endangered species (plants or animals) are found in the area of the Lanai Airport. A copy of the U.S. Department of Interior letter dated October 25, 1989 is included in Appendix F.

A botanical survey of the lands proposed for the expansion of Lanai Airport was conducted on November 10, 1989. The report prepared on that survey is included in Appendix G.

Most of the vegetation on the site consists of actively cultivated pineapple fields. Weedy species associated with agricultural lands are found more commonly along the less maintained areas such as roadsides, drainageways, and margins of fields. Scrub vegetation, which covers roughly 30 percent of the property, is usually found on abandoned pineapple fields. This vegetation type is composed of a mixed grass associated with scattered shrubs. A small gulch area near Kaupili Road supports scattered koa-haole shrubs and Guinea grass scrub.

There is very little of botanical interest within the lands proposed for the Airport expansion. Actively cultivated fields or weedy scrub are the major vegetation types. Of the 43 species inventoried on the site, 39 (91 percent) are introduced. Because of the past agricultural activities, there are no sensitive native plant communities remaining on the study site. None of the native plants are rare, threatened, or endangered.

A faunal survey of the lands proposed for the expansion of Lanai Airport was conducted on November 10, 1989. The report prepared on that survey is included in Appendix B.

The area proposed for expansion of the Lanai Airport consists of previously and currently cultivated pineapple fields, with few native plant species present. Only a few trees, all of them exotic species, are found on the site; this greatly restricts nesting activities by most of the bird species there. In this severely disturbed, non-native habitat, almost all the species observed were foreign. Ten bird species were recorded, but the only one native is the Pacific Golden-Plover which is a migratory species that nests in the Arctic. Signs of two mammal species were noted, but these two, as well as the House Mouse which is probably present, are also foreign species.

A. Impacts

There are no botanical limitations to the development of the project site. The proposed expansion of the Airport is not expected to have a significant negative impact on the total Island-wide populations of the species involved; the majority are introduced and the few native species on the site also occur in similar environmental habitats throughout the Islands.

The proposed project is not expected to have any significant impact on the biological communities of the study site, due to the present severe disturbance to the vegetation, and the consequent almost complete absence of native vertebrates. The site as it is today does not offer any suitable habitat for most native species, nor will it after the proposed modifications are completed.

B. Mitigation Measures

None

3.5 NOISE

3.5.1 DAY/NIGHT WIND CONDITIONS

The meteorological conditions at Lanai can be significant in respect to their influence on operational possibilities and constraints at Lanai Airport. Relatively little data are available on wind conditions at Lanai Airport, and no wind data were located for the Ldn nighttime penalty period of 10:00 PM through 7:00 AM. Wind readings obtained in Lanai City in CY1941 during the daytime hours of 8:00 AM to 2:30 PM indicated that trade winds occurred at Lanai City approximately 86.6 percent of the time, and Kona winds occurred approximately 13.4 percent of the time. This is the typical frequency of trade and Kona winds which occur on the windward side of the Hawaiian Islands.

However, wind data obtained by the Weather Bureau at Lanai Airport from 1957 to 1961, as well as 1965 data shown on the wind rose on the 1965 Airport Layout Plan (ALP) for Lanai Airport, indicate that the frequency of kona winds is much greater than 13.4 percent at the Airport, and possibly as high as 30 to 39 percent. The possible reasons for this are: the obstruction created by the mountains northeast of the Airport, and the greater influence of sea breezes from the southwest at the Airport location during the daytime period.

Table 3-1 presents a summary of the average wind conditions and runway use frequencies which were assumed for Lanai Airport during the Base Year period. Because wind data were not available for the nighttime period, it was assumed that both the daytime and nighttime runway use frequencies were identical in the noise analysis.

3.5.2 THERMAL INVERSIONS

The other significant meteorological factor is the possibility of thermal inversions occurring during the late night and early morning periods of the winter months. These thermal inversions, which have been confirmed by nightly soundings of the atmosphere at State Airports at Hilo, Hawaii and Lihue, Kauai, are caused by nighttime radiational cooling of the ground, which is reinforced by the cool drainage wind flow from the mountains at

Table 3-1

SUMMARY OF WIND AND TRAFFIC PATTERN CONDITIONS AT LANAI AIRPORT

A. ANNUALIZED, DAYTIME PERCENTAGES FOR WINDS ALIGNED TO RUNWAY 03-21:*

DIRECTION	< 4 MPH	4 TO 7 MPH	7 TO 15 MPH	>15 MPH
Trade	-	20.2%	16.7%	31.0%
Kona	-	¦----------	21.7%	----------¦
Calms	5.4%	-	-	-
Crosswinds	-	-	¦-------- 5.0%	-------¦

B. ANNUALIZED, RUNWAY USE FREQUENCY FOR RUNWAY 03-21:

WINDS	---- TAKEOFFS -----		---- LANDINGS -----	
	RUNWAY 03	RUNWAY 21	RUNWAY 03	RUNWAY 21
Calms	0.0%	5.4%	5.4%	0.0%
Light Trades	10.1%	10.1%	20.2%	0.0%
Mod. Trades	16.7%	0.0%	16.7%	0.0%
Brisk Trades	31.0%	0.0%	31.0%	0.0%
Light Kona	0.0%	10.0%	10.0%	0.0%
Strong Kona	0.0%	11.7%	0.0%	11.7%
Crosswinds	0.0%	5.0%	5.0%	0.0%
Totals:	57.8%	42.2%	88.3%	11.7%

*Sources: (1) Weather Bureau, 1957 to 1961, Lanai Airport Wind Rose

(2) January to December, 1965 Wind Rose on Airport Layout Plan, Lanai Airport.

elevations higher than the Airport. Average strength of the inversion is usually 3 degrees Fahrenheit, with a range of 0 to 6 degrees. Average height of the inversion layer is 300 feet, with a range of 200 to 400 feet. These thermal inversion layers tend to support sound ducting, which causes sound to travel for longer distances at reduced attenuation (similar to sound propagation in a tunnel).

The net amplification effect of sound ducting is such that noise from distant Airport departure events are significantly louder than normal, particularly when these events occur during the nighttime or early morning hours. During the summer months, the possibility of thermal inversion is reduced during the nighttime and early morning hours. This is due to the generally warmer ground temperatures and the stronger nighttime trade winds, which tend to negate the effects of the cool drainage winds.

Data documenting the occurrence of the nighttime inversion layer at Lanai are not available. Due to the relatively high elevation of Lanai Airport and Lanai City (1,200+ feet MSL) in relationship to the average height of the nighttime inversion layer (300 feet MSL), the likelihood of a nighttime inversion layer occurring regularly over the center of Lanai is considered to be low. For this reason, the frequency of sound amplification during the early morning hours on Lanai is also believed to be low.

3.5.3 BACKGROUND AMBIENT NOISE

Existing background ambient noise levels (exclusive of aircraft noise) in the areas surrounding Lanai Airport are estimated to range from 35 to 60 Ldn. Higher noise levels of 60 Ldn exist along the rights-of-way of the two major roadways which connect Lanai City with the Airport, Kaumalapau Harbor, and Manele Bay, but these higher noise levels are generally confined to the roadway corridors. Locations removed from the roadway corridors can be characterized as having relatively low background ambient noise levels of 35 to 50 Ldn. Noise levels of approximately 55 to 65 Ldn exist along the unprotected shore lines of the Island due to surf noise. In general, background ambient noise levels on Lanai are not high enough to cause beneficial noise masking effects, which would reduce the audibility of aircraft noise events.

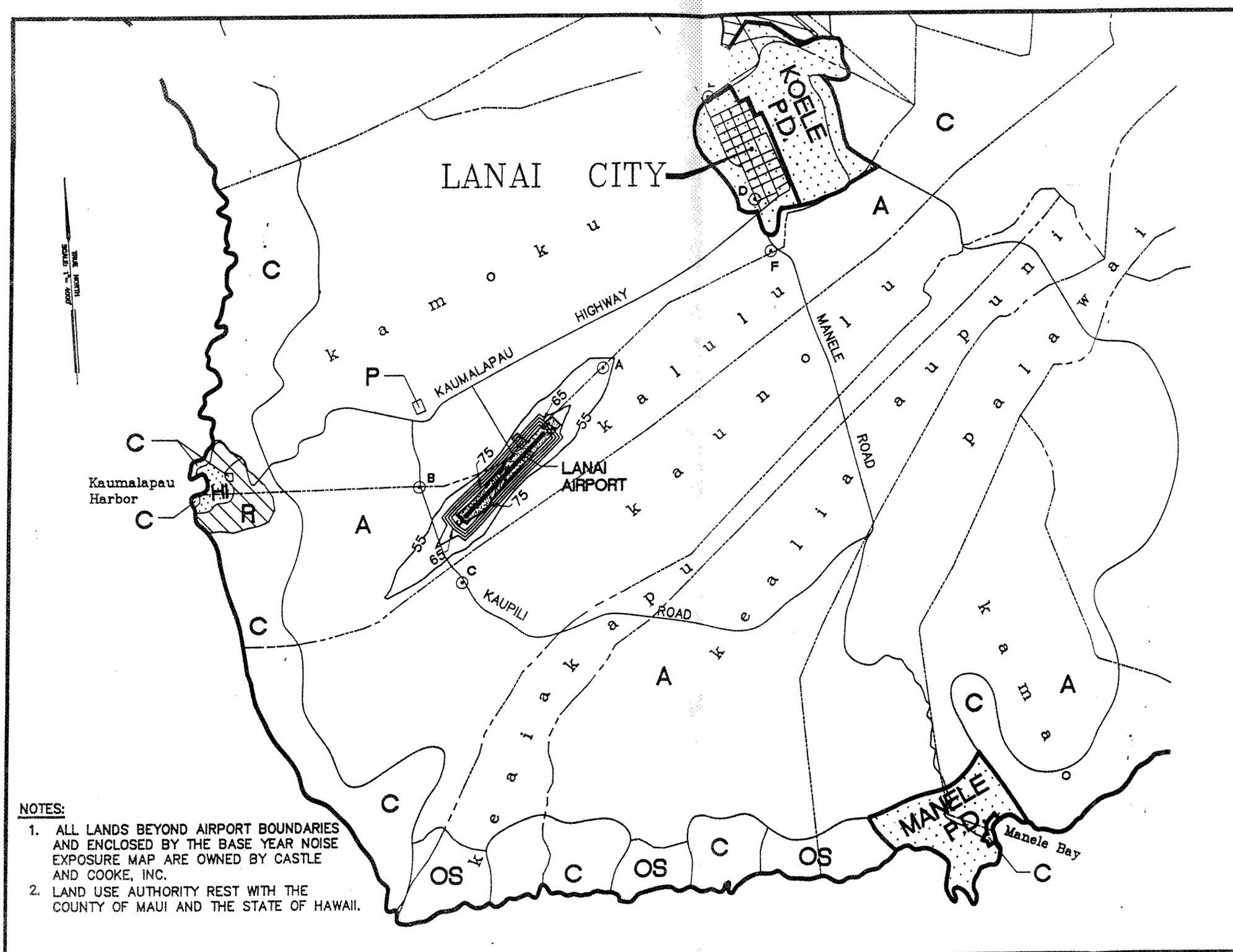
3.5.4 CALCULATED NOISE LEVELS

3.5.4.1 Base Year Noise Exposure Map

Figure 3-3 presents the Base Year (1988) Noise Exposure Map for Lanai Airport; it shows aircraft noise contour lines at 5 Ldn intervals between 55 Ldn and 75 Ldn. The aircraft noise contours were calculated using the FAA Integrated Noise Model, Version 3.9 and an assumed 5-degree glide slope for approaches. A detailed discussion of the assumptions used, input used to generate the Base Year Noise Exposure Map and the results of analyses designed to validate the model are presented in the Lanai Airport FAR Part 150 Noise Compatibility Program Report, Volume II, December 1989.

3.5.4.2 Ldn at Noise Monitoring Sites

Base Year (1988) noise levels at the three (3) monitoring sites near the Airport and the three (3) sites near Lanai City were calculated using INM Version 3.9 and are summarized in Table 3-2. These were obtained using the Grid Output module of the INM. The computed "Total Ldn" at each noise monitoring site was essentially equal to, and dominated by, the noise generated by airborne aircraft rather than by the rearward start-to-roll noise generated



Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT PART 150 NOISE COMPATIBILITY PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

BASE YEAR NOISE EXPOSURE MAP (CY 1988)

LEGEND:

- C CONSERVATION
- A AGRICULTURAL
- R RURAL
- OS OPEN SPACE
- PD PROJECT DISTRICT
- HI HEAVY INDUSTRIAL
- LANAI CITY
- AIRPORT BOUNDARY
- ⊙ NOISE MONITORING SITE

GRAPHIC SCALE IN FEET
2000 1000 0 2000 4000

PorEn, Inc. dba
PARK ENGINEERING

DATE:
DWG. NO.
FIGURE 3-3

Table 3-2

BASE YEAR (1988) LDN AT NOISE MONITORING SITES IN THE VICINITY OF LANAI AIRPORT

SITE	TOTAL LDN
A	56.0
B	45.3
C	47.6
D	34.0
E	33.1
F	34.0

Source: Y. Ebisu & Associates, Inc.

by aircraft beginning their takeoff runs. Rearward start-to-roll noise components are underestimated by the FAA INM, but these model inaccuracies are masked by the more dominant noise contributions from aircraft in flight past the monitoring sites.

3.5.4.3 Area Significantly Affected by Aircraft Noise

The noise contours shown in Figure 3-3 were used by the INM to calculate the total areas enclosed by the Base Year (1988) 75 through 55 Ldn contour lines. The results of these calculations are as follows:

Base Year Area Between Contours

Enclosed Noise Levels	Miles	Square Acres	Square Miles	Acres
> 75 Ldn	0.16	102	0.16	102
70 to 75 Ldn	0.05	32	0.21	134
65 to 70 Ldn	0.05	32	0.26	166
60 to 65 Ldn	0.09	58	0.35	224
55 to 60 Ldn	0.47	301	0.82	525

A breakdown of these areas by type of existing land use is presented in Section 3.5.5, below.

3.5.5 EXISTING LAND USE COMPATIBILITY

3.5.5.1 Using FAR Part 150 Standards

As shown in the Base Year (1988) Noise Exposure Map of Figure 3-3, noise sensitive land uses are not enclosed by the 55 Ldn through 75 Ldn contours. It should be noted that there are no residences, public use buildings, or other noncompatible land uses within the 55 Ldn Contour of the Base Year Noise Exposure Map. The lands enclosed by the Base Year Noise Exposure Map are those within the Airport boundaries and agricultural lands which surround the Airport. The noise contours in Figure 3-3 and the FAR Part 150 land use compatibility criteria contained in Table 3-3 indicate that all land uses in the Lanai Airport environs are compatible with aircraft noise levels as depicted in the Base Year Noise Exposure Map. Of the total 525 acres enclosed by the 55 Ldn contour, approximately 93 acres are within the Airport boundaries, and the remaining 432 acres are presently used for the growing of pineapples or for public roadways.

3.5.5.2 Using Standards Recommended by the State DOT

Existing land use compatibility was also evaluated using the more stringent noise compatibility standards recommended by the State of Hawaii Department of Transportation (Table 3-4). As was the case with the use of the FAR Part 150 standards of Table 3-3, the Base Year land uses in the airport environs were compatible with the aircraft noise levels depicted in the Base Year Noise Exposure Map. If the land uses surrounding the Airport were not compatible with the airport noise levels, it would be expected (by the fact that these standards are approximately 5 Ldn lower than those contained in FAR Part 150

Table 3-3

FAR PART 150 RECOMMENDATIONS FOR LAND USE COMPATIBILITY WITH YEARLY DAY-NIGHT AVERAGE SOUND LEVELS (LDN)

TYPE OF LAND USE	Yearly	
Day-Night Average Sound Level	< 65	65-70
70-75 / 75-80 / 80-85 / > 85		
RESIDENTIAL:		
Residential, other than mobile homes and transient lodgings	Y	N(1)
N(1) / N / N / N		
Mobile home parks	Y	N
N / N / N / N		
Transient lodgings	Y	N(1)
N(1) / N(1) / N / N		
PUBLIC USE:		
Schools	Y	N(1)
N(1) / N / N / N		
Hospitals and nursing homes	Y	25
30 / N / N / N		
Churches, auditoriums, and concert halls	Y	25
30 / N / N / N		
Government services	Y	Y
25 / 30 / N / N		
Transportation	Y	Y
Y(2) / Y(3) / Y(4) / Y(4)		
Parking	Y	Y
Y(2) / Y(3) / Y(4) / N		
COMMERCIAL USE:		
Offices, business and professional	Y	Y
25 / 30 / N / N		
Wholesale and retail - bldg.mater., hardware, & farm equip.	Y	Y
Y(2) / Y(3) / Y(4) / N		
Retail trade - general	Y	Y
25 / 30 / N / N		
Utilities	Y	Y
Y(2) / Y(3) / Y(4) / N		
Communication	Y	Y
25 / 30 / N / N		
MANUFACTURING AND PRODUCTION:		
Manufacturing, general	Y	Y
Y(2) / Y(3) / Y(4) / N		
Photographic and optical	Y	Y
25 / 30 / N / N		

Table 3-3 -- continued

FAR PART 150 RECOMMENDATIONS FOR LAND USE COMPATIBILITY WITH YEARLY DAY-NIGHT AVERAGE SOUND LEVELS (LDN)

TYPE OF LAND USE	Yearly	
Day-Night Average Sound Level	< 65	65-70
70-75 / 75-80 / 80-85 / > 85		
Agriculture (except livestock) and forestry	Y	Y(6)
Y(7) / Y(8) / Y(8) / Y(8)		
Livestock farming and breeding	Y	Y(6)
Y(7) / N / N / N		
Mining and fishing, resource production and extraction	Y	Y
Y / Y / Y / Y		
RECREATIONAL:		
Outdoor sports arenas and spectator sports	Y	Y(5)
Y(5) / N / N / N		
Outdoor music shells, amphitheaters	Y	N
N / N / N / N		
Nature exhibits and zoos	Y	Y
N / N / N / N		
Amusements, parks, resorts and camps	Y	Y
Y / N / N / N		
Golf courses, riding stables and water recreation	Y	Y
25 / 30 / N / N		

Numbers in parentheses refer to notes.

* The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

KEY TO TABLE 3-3:

Y(Yes) = Land Use and related structures compatible without restrictions.

N(No) = Land Use and related structures are not compatible and should be prohibited.

Table 3-3 -- continued

FAR PART 150 RECOMMENDATIONS FOR LAND USE COMPATIBILITY WITH YEARLY DAY-NIGHT AVERAGE SOUND LEVELS (LDN)

NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.

25, 30, or 35 = Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

NOTES FOR TABLE 3-3:

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(2) Measures to achieve NLR 25 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

(3) Measures to achieve NLR of 30 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

(4) Measures to achieve NLR 35 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

(5) Land use compatible provided special sound reinforcement systems are installed.

(6) Residential buildings require a NLR of 25.

(7) Residential buildings require a NLR of 30.

(8) Residential buildings not permitted.

Source: FAR Part 150, Appendix A, Table 1.

Table 3-4

STATE DEPARTMENT OF TRANSPORTATION RECOMMENDATIONS FOR LOCAL LAND USE COMPATIBILITY EXPRESSED IN YEARLY DAY-NIGHT AVERAGE SOUND LEVELS (LDN)

TYPE OF LAND USE	Yearly	
Day-Night Average Sound Level	< 60	60-65
65-70 / 70-75 / 75-80 / 80-85		
RESIDENTIAL:		
Low density residential, resorts, and hotels (outdoor facil.)	Y(a)	N(b)
N / N / N / N		
Low density apartment with moderate outdoor use	Y	N(b)
N / N / N / N		
High density apartment with limited outdoor use	Y	N(b)
N(b) / N / N / N		
Transient lodgings with limited outdoor use	Y	N(b)
N(b) / N / N / N		
PUBLIC USE:		
Schools, day-care centers, libraries, and churches	Y	N(c)
N(c) / N(c) / N / N		
Hospitals, nursing homes, clinics, and health facilities	Y	Y(d)
Y(d) / Y(d) / N / N		
Indoor auditoriums and concert halls	Y(c)	Y(c)
N / N / N / N		
Government services and office buildings serving the public .	Y	Y
Y(d) / Y(d) / N / N		
Transportation and Parking	Y	Y
Y(d) / Y(d) / Y(d) / Y(d)		
COMMERCIAL AND GOVERNMENT USE:		
Offices - government, business, and professional	Y	Y
Y(d) / Y(d) / N / N		
Wholesale and retail - bldg.mater., hardware, & heavy equip..	Y	Y
Y(d) / Y(d) / Y(d) / Y(d)		
Airport businesses - car rental, lei stands, ticketing, etc..	Y	Y
Y(d) / Y(d) / N / N		
Retail, restaurants, shopping centers, financial inst., etc..	Y	Y
Y(d) / Y(d) / N / N		
Power plants, sewage treatment plants, and base yards	Y	Y
Y(d) / Y(d) / Y(d) / N		
Studios without outdoor sets, broadcasting, prod. facilities.	Y(c)	Y(c)
N / N / N / N		

Table 3-4 -- (continued)

STATE DEPARTMENT OF TRANSPORTATION RECOMMENDATIONS FOR LOCAL LAND USE COMPATIBILITY EXPRESSED IN YEARLY DAY-NIGHT AVERAGE SOUND LEVELS (LDN)

TYPE OF LAND USE	Yearly	
Day-Night Average Sound Level	< 60	60-65
65-70 70-75 75-80 80-85		
MANUFACTURING, PRODUCTION AND STORAGE:		
Manufacturing, general	Y	Y
Y(d) Y(d) Y(d) N		
Photographic and optical	Y	Y
Y(d) Y(d) N N		
Agriculture (except livestock) and forestry	Y	Y(e)
Y(e) Y(e) Y(e) Y(e)		
Livestock farming and breeding	Y	Y(e)
Y(e) N N N		
Mining and fishing, resource production and extraction	Y	Y
Y Y Y Y		
RECREATIONAL USE:		
Outdoor sports arenas and spectator sports	Y	Y(f)
Y(f) N N N		
Outdoor music shells, amphitheaters	Y(f)	N
N N N N		
Nature exhibits and zoos, neighborhood parks	Y	Y
Y N N N		
Amusements, beach parks, active playgrounds, etc.	Y	Y
Y Y N N		
Public golf courses, riding stables, cemeteries,gardens, etc.	Y	Y
N N N N		
Professional/resort sport facilities, media event fac., etc..	Y(f)	N
N N N N		
Extensive natural wildlife and recreation areas	Y(f)	N
N N N N		

Numbers in parentheses refer to notes.

KEY TO TABLE 3-4:

Y(Yes) = Land Use and related structures compatible without restrictions.
N(No) = Land Use and related structures are not compatible and should be prohibited.

NOTES FOR TABLE 3-4:

(a) A noise level of 60 Ldn does not eliminate all risks of adverse noise impacts from aircraft noise. However, the 60 Ldn planning level has been selected by the State Airports Division as an appropriate compromise between the minimal risk level of 55 Ldn and the significant risk level of 65 Ldn.

(b) Where the community determines that these uses must be allowed, Noise Level Reduction (NLR) measures to achieve interior levels of 45 Ldn or less should be incorporated into building codes and be considered in individual approvals. Normal local construction employing natural ventilation can be expected to provide an average NLR of approximately 9 dB. Total closure plus air conditioning may be required to provide additional outdoor to indoor NLR, and will not eliminate outdoor noise problems.

(c) Because the Ldn noise descriptor system represents a 24-hour average of individual aircraft noise events, each of which can be unique in respect to amplitude, duration, and tonal content, the NLR requirements should be evaluated for the specific land use, interior acoustical requirements, and properties of the aircraft noise events. NLR requirements should not be based solely upon the exterior Ldn exposure level.

(d) Measures to achieve required NLR must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

(e) Residential buildings require NLR. Residential buildings should not be located where noise is greater than 65 Ldn.

(f) Impact of amplitude, duration, frequency, and tonal content of aircraft noise events should be evaluated.

standards) that the numbers of acres, dwelling units, and resident population determined to be in the incompatible zone would be much higher than the comparable figures calculated using the FAR Part 150 compatibility standards. However, due to the relatively undeveloped nature of the lands surrounding Lanai Airport, incompatible uses of the lands surrounding the Airport are not changed significantly by the use of the more stringent State DOT standards.

A. Impacts

Impacts associated with increased single event noise levels at Lanai City may occur as a result of the proposed runway extension from 5,000 feet to 7,000 feet. With the completion of the proposed runway extension, large jet aircraft (e.g., B-737, DC-9) arriving on Runway 21 may overfly portions of Lanai City. Increases of aircraft noise levels are predicted to occur during landings on Runway 21, and may be in the order of 8 to 9 dB above current noise levels. In addition, with the runway extended by 2,000 feet to the northeast, there may be a greater tendency of aircraft to overfly existing residences at Kaumalapau Harbor following departures from Runway 21.

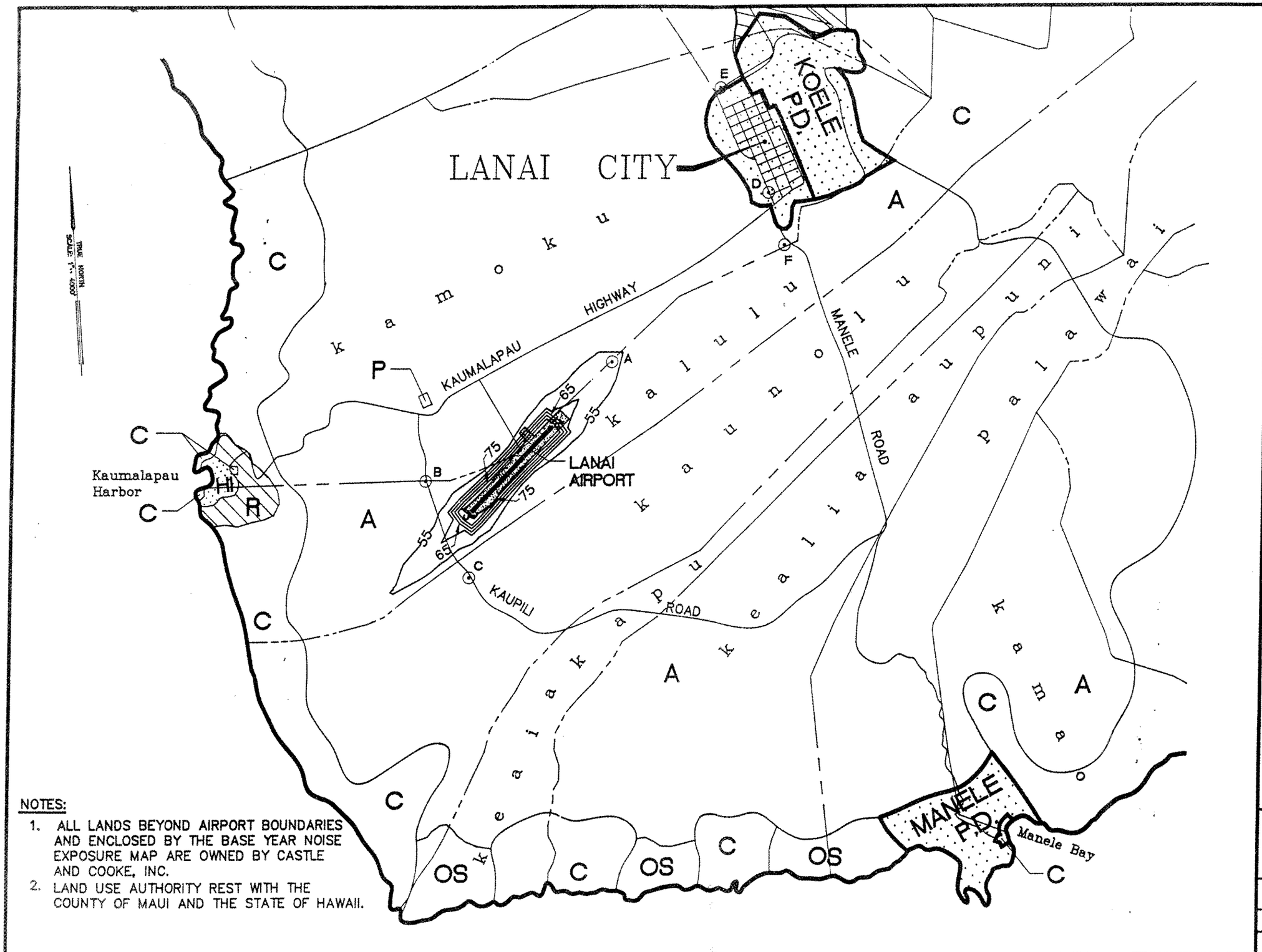
Figures 3-4 through 3-8 present forecast aircraft noise levels for CY1993, 2000, and 2005. For CY1993, noise contours are shown for the forecast conditions with (Figure 3-4) and without (Figure 3-5) the proposed runway extension. The CY2000 contours depict conditions with the 2,000 feet runway extension, both without (Figure 3-6) and with (Figure 3-7) an extended straight departure track from Runway 21 to avoid overflights of Kaumalapau Harbor. The CY2005 contours (Figure 3-8) depict conditions with the 2,000 feet runway extension as well as an extended straight departure track from Runway 21. From these CY1993 noise contours, as well as the CY 2000 and 2005 contours, it can be concluded that the proposed runway extension should not cause any land use incompatibilities between CY1993 and CY2005.

B. Mitigation Measures

The recommended noise mitigation measures for minimizing single event noise impacts from the proposed runway extension are:

- Development of a preferential runway use system designed to mitigate noise impacts on residents in the vicinity of Lanai City, which is northeast of the Airport, particularly following extension of the existing runway to 7,000 feet. This preferential runway use plan should include provisions for minimizing overflights of noise sensitive areas.

- Monitoring of aircraft flight tracks and noise levels following the planned extension of Runway 3-21 to minimize overflights of Lanai City and high single event noise levels in the community.



Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT PART 150 NOISE COMPATIBILITY PLAN
ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

5 YEAR NOISE EXPOSURE MAP, LANAI AIRPORT

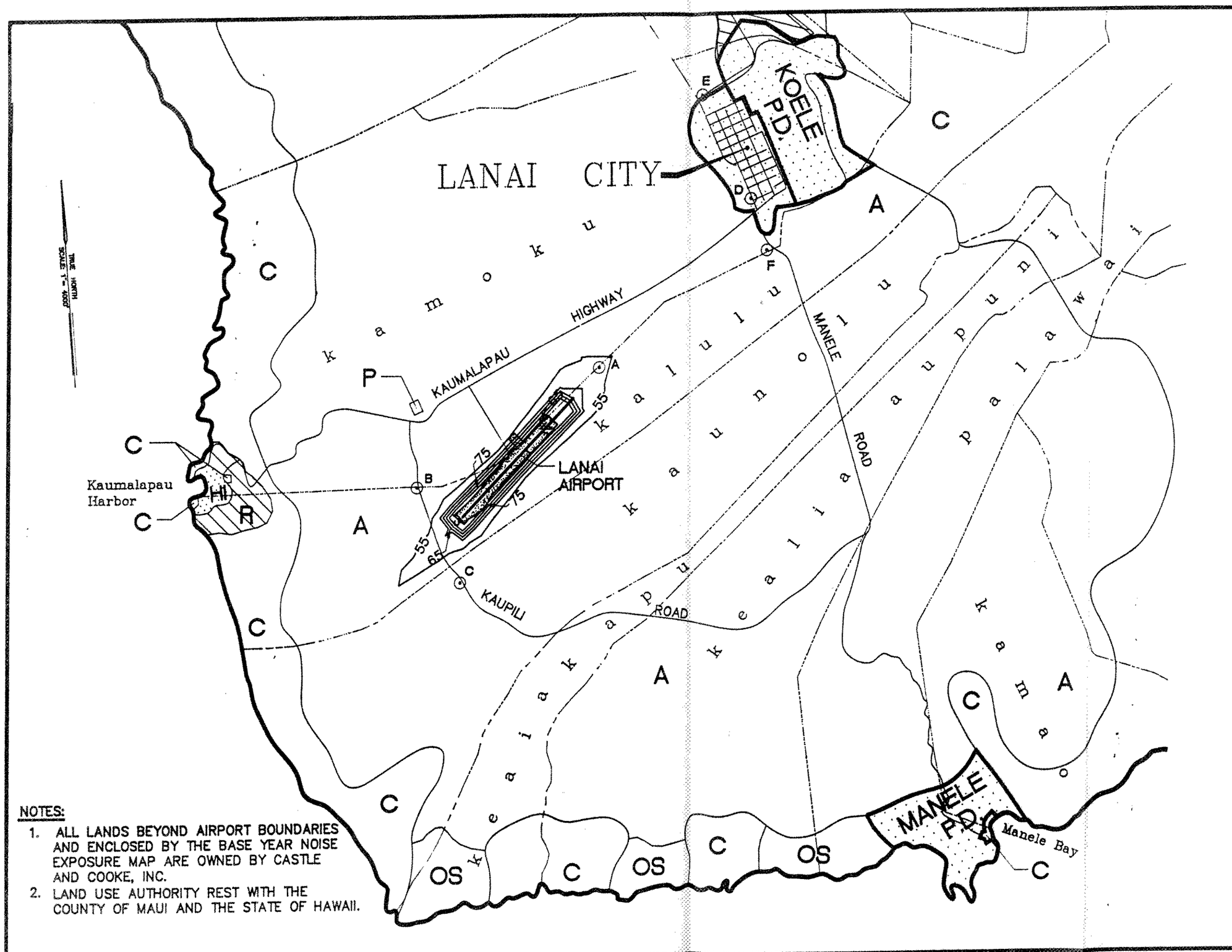
LEGEND:

- C CONSERVATION
- A AGRICULTURAL
- R RURAL
- OS OPEN SPACE
- P.D. PROJECT DISTRICT
- HI HEAVY INDUSTRIAL
- LANAI CITY
- AIRPORT BOUNDARY
- ⊙ NOISE MONITORING SITE

GRAPHIC SCALE IN FEET
2000 1000 0 2000 4000

ParEn, Inc. dba
PARK ENGINEERING

DATE:
DWG. NO.
FIGURE 3-4



NOTES:

1. ALL LANDS BEYOND AIRPORT BOUNDARIES AND ENCLOSED BY THE BASE YEAR NOISE EXPOSURE MAP ARE OWNED BY CASTLE AND COOKE, INC.
2. LAND USE AUTHORITY REST WITH THE COUNTY OF MAUI AND THE STATE OF HAWAII.

Airports Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT PART 150 NOISE COMPATIBILITY PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

5 YEAR NOISE EXPOSURE MAP, WITH 7000 FT. RUNWAY

LEGEND:

- C CONSERVATION
- A AGRICULTURAL
- R RURAL
- OS OPEN SPACE
- PD PROJECT DISTRICT
- HI HEAVY INDUSTRIAL
- LANAI CITY
- AIRPORT BOUNDARY
- ⊙ NOISE MONITORING SITE

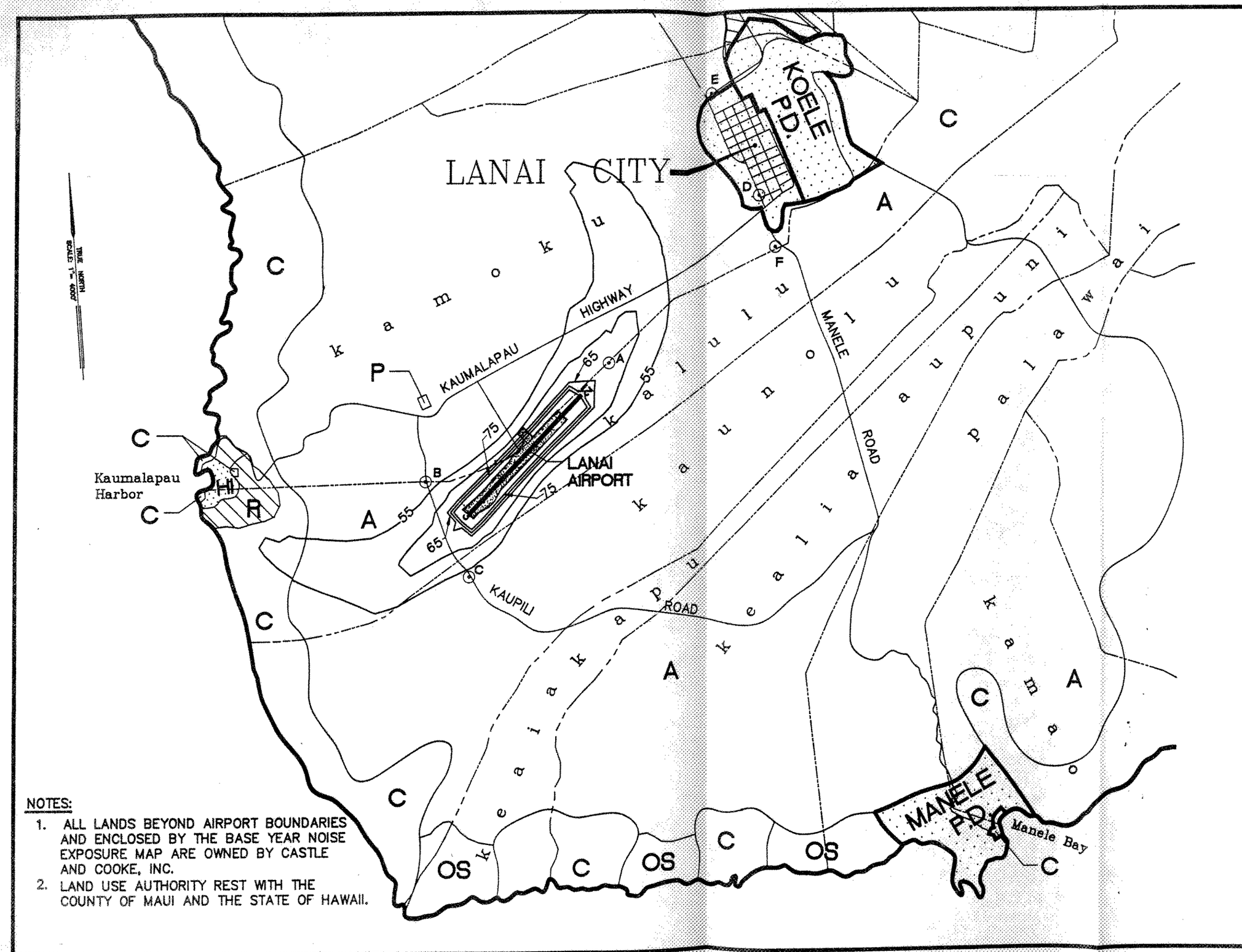
GRAPHIC SCALE IN FEET
2000 1000 0 2000 4000

PorEn, Inc. dba
PARK ENGINEERING

DATE:

DWG. NO.

FIGURE 3-5



NOTES:

1. ALL LANDS BEYOND AIRPORT BOUNDARIES AND ENCLOSED BY THE BASE YEAR NOISE EXPOSURE MAP ARE OWNED BY CASTLE AND COOKE, INC.
2. LAND USE AUTHORITY REST WITH THE COUNTY OF MAUI AND THE STATE OF HAWAII.

Airports Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT PART 150 NOISE COMPATIBILITY PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

YEAR 2000 NOISE EXPOSURE MAP, WITH 7000 FT. RUNWAY

LEGEND:

- C — CONSERVATION
- A — AGRICULTURAL
- R — RURAL
- OS — OPEN SPACE
- PD — PROJECT DISTRICT
- HI — HEAVY INDUSTRIAL
- LANAI CITY
- AIRPORT BOUNDARY
- ⊙ NOISE MONITORING SITE

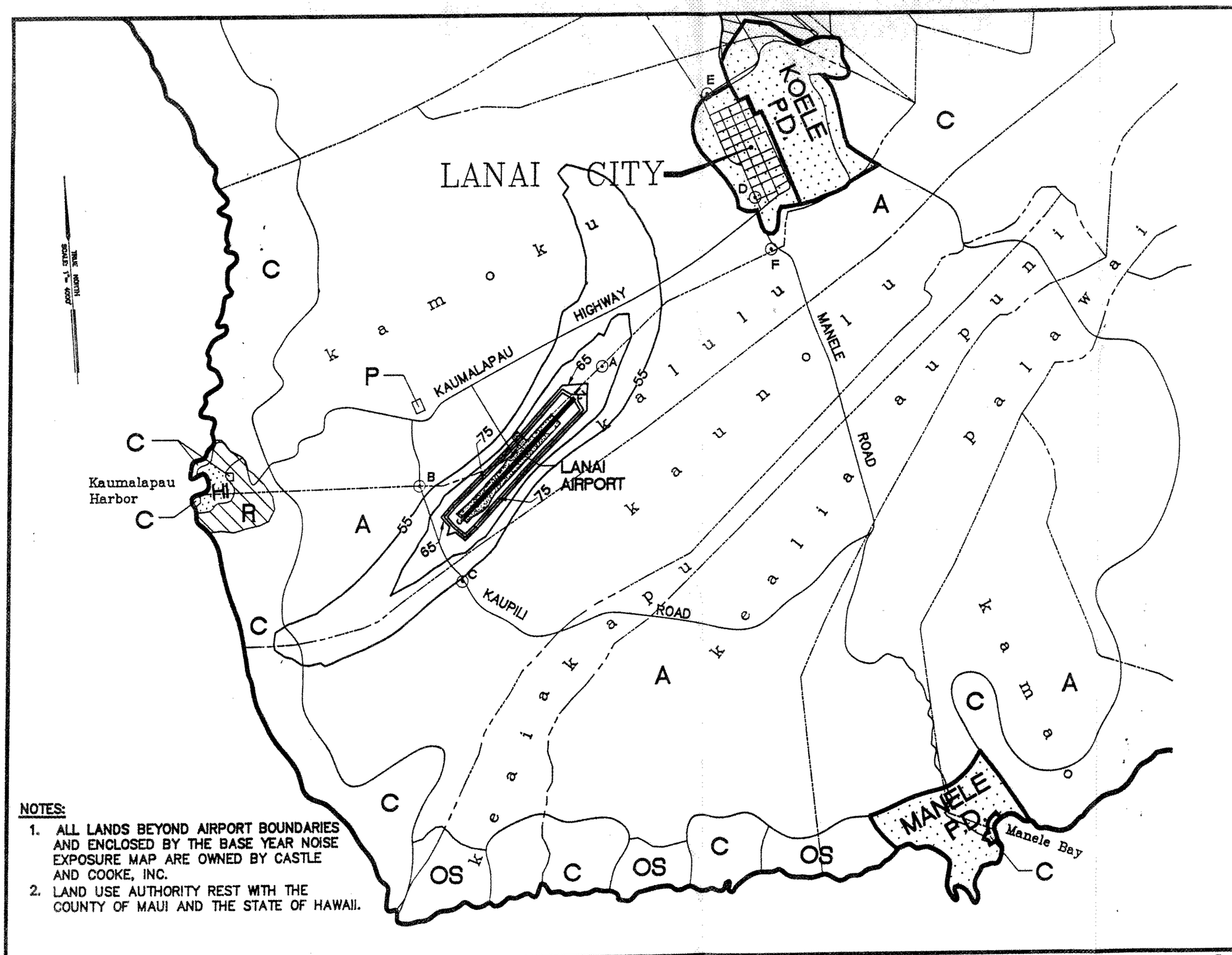
GRAPHIC SCALE IN FEET
2000 1000 0 2000 4000

ParEn, Inc. dba
PARK ENGINEERING

DATE:

DWG. NO.

FIGURE 3-6



Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT PART 150 NOISE COMPATIBILITY PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

YEAR 2000 NOISE EXPOSURE MAP, WITH 7000 FT. RUNWAY AND EXTENDED SOUTH DEPARTURE

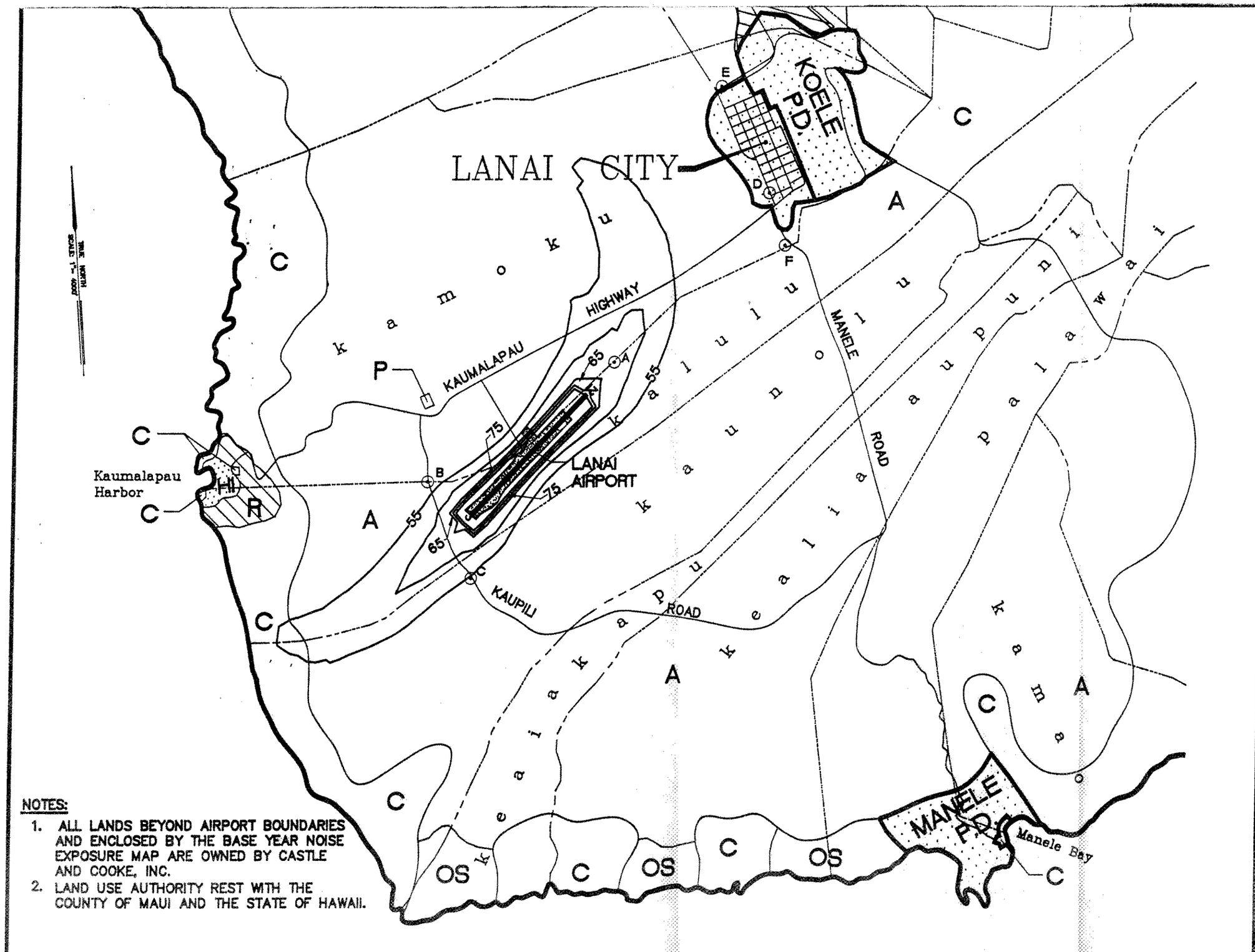
LEGEND:

- C CONSERVATION
- A AGRICULTURAL
- R RURAL
- OS OPEN SPACE
- PD PROJECT DISTRICT
- HI HEAVY INDUSTRIAL
- LANAI CITY
- AIRPORT BOUNDARY
- ⊙ NOISE MONITORING SITE

GRAPHIC SCALE IN FEET
2000 1000 0 2000 4000

ParEn, Inc. dba
PARK ENGINEERING

DATE:
DWG. NO.
FIGURE 3-7



NOTES:

1. ALL LANDS BEYOND AIRPORT BOUNDARIES AND ENCLOSED BY THE BASE YEAR NOISE EXPOSURE MAP ARE OWNED BY CASTLE AND COOKE, INC.
2. LAND USE AUTHORITY REST WITH THE COUNTY OF MAUI AND THE STATE OF HAWAII.

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT PART 150 NOISE COMPATIBILITY PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

YEAR 2005 NOISE EXPOSURE MAP, WITH 7000 FT. RUNWAY AND EXTENDED SOUTH DEPARTURE

LEGEND:

- C — CONSERVATION
- A — AGRICULTURAL
- R — RURAL
- OS — OPEN SPACE
- PD — PROJECT DISTRICT
- HI — HEAVY INDUSTRIAL
- LANAI CITY
- AIRPORT BOUNDARY
- ⊙ NOISE MONITORING SITE

GRAPHIC SCALE IN FEET
2000 1000 0 2000 4000

PartEn, Inc. dba
PARK ENGINEERING

DATE:
DWG. NO.
FIGURE 3-8

- Annual monitoring of aircraft operations and noise levels at Lanai Airport by the State Department of Transportation. The monitoring should be aimed at identifying problem areas and evaluating the extent to which recommendations of the recently completed Lanai FAR Part 150 Plan are being successfully implemented. The Department should conduct annual workshops and/or public informational meetings to discuss the status of the Noise Compatibility Program and to educate and inform airport users and the Lanai community.

3.6 AIR QUALITY

The evaluation of air quality and the potential impacts thereto requires data concerning: existing air quality (and pollutant levels present), the type and quantities of pollutant generating sources (aircraft, automobiles, etc.), and emissions' factors for these sources. In the case of the Lanai Airport, there has not been any air quality monitoring, hence, the existing ambient air quality cannot be assessed and used for a baseline quantity. Nor have any particular quantifications been presented regarding emissions' sources in the Airport area or the Island of Lanai.

This discussion presents available quantifiable data and projections based upon emissions' factors and forecast aircraft and vehicular traffic at the Airport. The resultant data is referenced to the existing State of Hawaii Air Quality Standards. The State Standards are being utilized in lieu of the Federal Air Quality Standards due to the more stringent nature of the State Standards. If a project's emissions levels do not exceed the criteria of the State Standards, the Federal Standards will not be violated. The Federal and State Standards are presented in Table 3-5.

Additional factors influencing the effects of pollutants upon populated areas are meteorological in nature. Temperature inversions, wind patterns, etc. can cause emissions to be more noticeable by one area than by another. As discussed earlier, the prevailing wind patterns on the Island of Lanai, generally flow from Lanai City to the Airport area and then seaward. This wind pattern would disperse and carry any Airport-related air quality effects away from the populated areas of Lanai City.

By utilizing the emissions factors (Table 3-6) in combination with the average daily aircraft operations for Lanai Airport based on the forecasts presented in Table 1-2, the projected aircraft-generated emissions for the Airport can be calculated. These calculated amounts are presented in Tables 3-7 through 3-10 for the years 1988, 1993, 2000 and 2005, respectively.

Table 3-11 presents a summation by Study Year and pollutant, of the aircraft operations related emissions from Tables 3-7 through 3-10.

Although existing background ambient air quality data are not available, an approximate quantification of aircraft emissions by study year for the Lanai Airport is shown in Table 3-12. These calculations have been derived from data (both monitored and modeled) for similar airports within the State. The emissions' levels shown have been presented to illustrate the minimal contributions by the Airport to the air quality of the Island of Lanai and, as compared to Table 3-5, their acceptability within the State Standards.

Table 3-5

STATE OF HAWAII AND
FEDERAL AMBIENT AIR QUALITY STANDARDS
(micrograms per cubic meter)

POLLUTANT	SAMPLING PERIOD	FEDERAL STANDARDS PRIMARY	FEDERAL STANDARDS SECONDARY	STATE STANDARDS
Total Suspended Particulates (TSP)	Annual Geometric Mean	50	50	60
	Maximum Average (in any 24-hour period)	150	150	150
Sulfur Oxides (SOx)	Annual Arithmetic Mean	80		80
	Maximum Average (in any 24-hour period)	365		365
Carbon Monoxide (CO)	Maximum Average (in any 8-hour period)	10,000		5,000
	Maximum Average (in any 1-hour period)	40,000		10,000
Nitrogen Oxides (NOx)	Annual Arithmetic Mean	100		70

Note: There are no current ambient standards for Hydrocarbons (HC)

Source: Hawaii Ambient Air Quality Standards (HAAQS), amended July, 1988
National Ambient Air Quality Standards (NAAQS), as amended through 1988

Table 3-6

AIRCRAFT AIR POLLUTANT FACTORS

AIRCRAFT TYPE	UNITS	POLLUTANT TSP	SOx	CO	HC	NOx
Piston	Kg/LTO	0.009	0.006	5.55	0.18	0.021
Turboprop	Kg/LTO	0.09	0.08	1.41	0.50	0.55
Jet	Kg/LTO	0.05	0.17	7.1	1.64	0.73
Helicopter	Kg/LTO	0.11	0.08	2.59	0.24	0.26

Kg/LTO = Kilograms per Landing/Take-off Cycle

TSP = Total Suspended Particulates
SOx = Oxides of Sulfur
CO = Carbon Monoxide
HC = Hydrocarbons
NOx = Oxides of Nitrogen

Source: U.S. Environmental Protection Agency Compilation of Air Pollutant Emission Factors and Lanai Airport Master Plan, 1990

Table 3-7

1988 EMISSIONS

AIRCRAFT TYPE	UNITS	POLLUTANT TSP	SOx	CO	HC	NOx
Piston	Kg/Day	0.38	0.27	231.68	7.62	0.895
	Kg/Year	138.7	99.55	563.2	2,701.3	326.68
Turboprop	Kg/Day	1.25	1.12	19.30	6.85	0.55
	Kg/Year	454.59	409.13	7,045.16	2,500.25	2,727.55
Jet	Kg/Day	0.03	0.08	3.59	0.82	0.73
	Kg/Year	9.95	30.69	1,310.68	298.66	137.23
Helicopter	Kg/Day	0.01	0.08	0.26	0.02	0.26
	Kg/Year	4.15	2.99	94.57	8.63	9.46

Kg/Day
Kg/Year = Total kilograms per time period based on Table 3-6 Factors multiplied by daily (yearly) number of operations by aircraft type.

TSP = Total Suspended Particulates
SOx = Oxides of Sulfur
CO = Carbon Monoxide
HC = Hydrocarbons
NOx = Oxides of Nitrogen

Source: U.S. Environmental Protection Agency Compilation of Air Pollutant Emission Factors and Lanai Airport Master Plan, 1990

Table 3-8

1993 EMISSIONS

AIRCRAFT TYPE	UNITS	POLLUTANT TSP	SOx	CO	HC	NOx
Piston	Kg/Day	0.31	0.22	188.55	6.18	0.73
	Kg/Year	112.82	78.97	68,419.09	2,256.36	265.12
Turboprop	Kg/Day	1.16	1.05	18.04	6.40	6.98
	Kg/Year	424.73	382.25	6,583.27	2,366.00	2,548.36
Jet	Kg/Day	0.12	0.08	3.59	0.82	0.73
	Kg/Year	41.98	140.89	6,029.14	1,373.73	610.55
Helicopter	Kg/Day	0.23	0.16	0.52	0.047	0.05
	Kg/Year	82.45	59.73	189.14	17.25	18.91

Kg/Day
Kg/Year = Total kilograms per time period based on Table 3-6 Factors multiplied by daily (yearly) number of operations by aircraft type.

TSP = Total Suspended Particulates
SOx = Oxides of Sulfur
CO = Carbon Monoxide
HC = Hydrocarbons
NOx = Oxides of Nitrogen

Source: U.S. Environmental Protection Agency Compilation of Air Pollutant Emission Factors and Lanai Airport Master Plan, 1990

Table 3-9

2000 EMISSIONS

AIRCRAFT TYPE	UNITS	POLLUTANT TSP	SOx	CO	HC	NOx
Piston	Kg/Day	0.27	0.19	166.36	5.45	0.52
	Kg/Year	99.55	69.68	60,722.72	1,989.25	189.14
Turboprop	Kg/Day	1.62	1.45	25.08	8.90	9.71
	Kg/Year	590.64	530.91	9,154.86	3,248.50	3,543.82
Jet	Kg/Day	0.25	0.84	35.91	8.18	3.64
	Kg/Year	91.25	306.93	13,106.82	2,986.36	1,327.27
Helicopter	Kg/Day	0.45	0.33	1.04	0.095	0.10
	Kg/Year	165.91	119.45	378.27	34.51	38.16

Kg/Day
Kg/Year = Total kilograms per time period based on Table 3-6 Factors multiplied by daily (yearly) number of operations by aircraft type.

TSP = Total Suspended Particulates
SOx = Oxides of Sulfur
CO = Carbon Monoxide
HC = Hydrocarbons
NOx = Oxides of Nitrogen

Source: U.S. Environmental Protection Agency Compilation of Air Pollutant Emission Factors, and Lanai Airport Master Plan, 1990

Table 3-10

2005 EMISSIONS

AIRCRAFT TYPE	UNITS	POLLUTANT TSP	SOx	CO	HC	NOx
Piston	Kg/Day	0.27	0.19	163.59	0.63	0.52
	Kg/Year	97.89	69.02	59,710.68	230.61	189.14
Turboprop	Kg/Day	1.62	1.45	25.08	9.71	9.71
	Kg/Year	590.64	530.91	9,154.86	3,543.82	3,543.82
Jet	Kg/Day	0.28	0.93	39.50	4.00	3.64
	Kg/Year	101.20	338.45	14,417.50	1,460.00	1,327.27
Helicopter	Kg/Day	0.68	0.49	1.55	0.16	0.10
	Kg/Year	248.86	179.18	567.41	56.58	38.16

Kg/Day
Kg/Year = Total kilograms per time period based on Table 3-6 Factors multiplied by daily (yearly) number of operations by aircraft type.

TSP = Total Suspended Particulates
SOx = Oxides of Sulfur
CO = Carbon Monoxide
HC = Hydrocarbons
NOx = Oxides of Nitrogen

Source: U.S. Environmental Protection Agency Compilation of Air Pollutant Emission Factors and Lanai Airport Master Plan, 1990

Table 3-11

AIRCRAFT EMISSIONS SUMMARY (Kg)

POLLUTANT	STUDY YEAR							
	1988		1993		2000		2005	
	Daily	Annual	Daily	Annual	Daily	Annual	Daily	Annual
TSP	1.67	608.06	1.81	661.98	2.59	947.3	2.85	1,040.25
SOx	1.48	540.2	1.81	661.98	2.81	1,026.98	3.06	1,116.90
CO	255.84	93,381.60	223.62	81,621.30	228.39	83,362.68	229.77	83,866.05
HC	15.31	5,587.82	16.39	5,982.58	22.63	8,260.61	23.39	8,537.35
NOx	8.76	3,197.07	9.43	3,442.60	14.09	5,124.85	14.49	5,290.84

Source: U.S. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors and Lanai Airport Master Plan, 1990

Table 3-12

APPROXIMATE AIRCRAFT EMISSIONS AS COMPARED TO STATE OF HAWAII STANDARDS

POLLUTANT	YEAR	AVERAGING PERIOD	CONCENTRATIONS (ug/m_3)[1]	STATE STANDARDS
SOx		Annual Mean		80 (Annual Mean)
	1988	Maximum	2.62[2]	365
	1993	Average	2.38	
	2000	(in 24-hours)	2.65	
	2005		2.74	
CO	1988	Maximum	86.93	10,000
	1993	Average	78.90	
	2000	(in 8-hours)	87.86	
	2005		90.96	
	1988	Maximum	61.94	40,000
	1993	Average	56.22	
	2000	(in 1-hour)	62.60	
	2005		64.81	
TSP				60 (Annual Mean)
	1988	Maximum	6.22[2]	150
	1993	Average	5.65	
	2000	(in 24-hours)	6.29	
	2005		6.52	
NOx	1988	Annual Mean	6.66[2]	70 (Annual Mean)
	1993		6.05	
	2000		6.73	
	2005		6.97	

1. ug/m_3 = micrograms per cubic meter (State Standards measuring criteria)

2. as the 24-hour projected emissions' levels are considerably below the annual average, it can be assumed that the emissions' levels from the Airport will be well within the acceptability criteria of the State Standards

Source: U.S. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors and Lanai Airport Master Plan, 1990

Automobile emissions on the Airport access road were calculated utilizing the vehicular trips per day for 1988 and 2005 at the intersection of the Airport access road and Kaumalapau Highway (as presented in Section 5 of this report). The trips per day were integrated into the emissions' formula using the Year 2000 MOBILE 2 Emissions Factors, assuming 10 miles per trip and an average vehicle speed of 25 miles per hour. The emissions for existing (1988) and forecast (2005) conditions are presented in Table 3-13.

A. Impacts

The air quality on the Island of Lanai is considered to be very good. Contributions to emissions' levels due to Airport operations, are not considered to be significant due to the limited number of aircraft operations combined with favorable meteorological conditions. No monitoring or measurement data relative to air quality are available for the Island of Lanai.

The expansion of the Airport will incrementally increase the Airport operational related emissions' levels over the long-term period. Construction activities will affect the air quality of the immediate area on a short-term basis due to equipment emissions and dust from grading.

B. Mitigation Measures

The long-term emissions' increase is not considered as significant as the pollutant levels will continue to be well within the State Air Quality Standards parameters. Prevailing meteorological conditions will continue to favorably affect the air quality of the Island of Lanai.

Construction effects will be short-term in duration and generally limited to the immediate vicinity of the Airport.

3.8 VISUAL QUALITY

Because of the agricultural usage of the land areas surrounding the Airport, the Airport facilities contrast with the green and red pineapple fields. The Airport facilities are located southwesterly of the Kaumalapau Highway and Lanai City. The view from the Airport presents a panoramic view towards the southwest Lanai Coast and the Pacific Ocean across the pineapple fields. To the northeast the view is across the pineapple fields towards Lanai City and Lanaihale.

Visually the Airport area is characterized by the three single-story buildings (buff sides with red and brown roofs), the red and white tower for the beacon, the parking areas, and the cleared and paved expanses of the airfield and aircraft parking apron. There is limited landscaping (grass, shrubs, and trees) in the immediate terminal and parking area as well as along the Airport Access Road.

A. Impacts

Portions of the pineapple fields will be cleared due to the proposed expansion of the Lanai Airport. Some of the fields within the expansion area will be replaced with buildings, roadways, pavement, or graded open areas.

Table 3-13

AUTOMOBILE EMISSIONS (Kg)

	STUDY YEAR			
	1988 (522 trips/day)		2005 (1,800 trips/day)	
POLLUTANT	Daily	Annual	Daily	Annual
TSP	1.57	573.05	5.41	1,974.65
SOx	1.09	397.85	3.78	2,379.70
CO	82.99	30,291.35	284.76	103,937.40
HC	8.67	3,164.55	29.89	10,909.85
NOx	6.15	2,244.75	21.20	7,738.00

Source: U.S. Environmental Protection Agency, Compilation Air Pollutant Emission Factors and Lanai Airport Master Plan, 1990

The aesthetic impact of the Airport will be an incremental increase and continuation of the present visual contrast between surrounding agricultural uses and the Airport area.

B. Mitigation Measures

As part of the Airport Master Plan Improvement Program, the existing structures will be replaced with a new passenger terminal complex. The new terminal area and surrounding landscaping, as well as landscaping along the access road, will be designed to improve the visual quality of the Airport. Design parameters will incorporate aesthetic values compatible with the surrounding area as well as the visual "atmosphere" of the Island of Lanai. The use of landscaping to screen views of certain areas of the Airport (e.g., parking lots, ground transportation service area, and maintenance and support areas) will also enhance the visual quality of the Airport.

3.8 HISTORIC AND CULTURAL RESOURCES

The State Historic Preservation Officer, Department of Land and Natural Resources (DLNR), has indicated that there are no known historic sites in the project area. (See Appendix C).

An initial finding of "no effect" was given to the proposed project based primarily upon the many years of agricultural cultivation of the project area. Pineapple production as well as development for the Lanai Airport have contributed to significant disturbance of the site.

Notwithstanding this determination by the DLNR, the State engaged Applied Research Group of the Bishop Museum to study/assess the potential existence of historic and cultural resources within the project area. The Museum found four objects believed to have potential archaeological significance. (See Appendix D). As a result of these findings, a second study was performed by Cultural Surveys, Hawaii.

The research by Cultural Surveys Hawaii indicates that the project area was utilized during traditional times for agriculture and probably associated habitation. Subsequent commercial pineapple cultivation has homogenized the landscape to such a degree that it is doubtful any subsurface cultural features still exist within the project area. No further archaeological work is deemed necessary.

Pertinent communications regarding Historic and Cultural Resources in the project area are contained in Appendices D and E of this report.

A. Impacts

Grading and/or other development for the improvements to the Lanai Airport has the potential to affect Historic and Cultural Resources which may be of significance should any subsurface cultural feature still exists.

B. Mitigation Measures

In the unlikely event a subsurface feature is unearthed during construction activities, "on-call" monitoring by a qualified archaeologist is recommended. This should include a contractual agreement to be "on-call," as well as analysis of any recovered materials.

SECTION 4

SECTION 4

IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

This section describes the socioeconomic considerations that impact and are influenced by the type and level of air traffic activity at the Lanai Airport. This section is divided into two parts. Part 1 describes population and Part 2 presents an overview of economic activity, including the Island's visitor industry, which should become a more important influence on Airport activity in the near future.

4.1 POPULATION

Table 4-1 contains data on Hawaii's resident population for the period 1960 through 1987. It shows that the State's population has increased by 71 percent over the past 27 years, from 632,772 in 1960 to 1,082,500 in 1987. Over the same period, Maui County's population has risen 110 percent (from 42,885 in 1960 to 89,900 in 1987). The average annual growth rate for Maui County has been 2.8 percent over those 27 years. Statewide, the population rose an average of 2.0 percent per year.

Population estimates for the Island of Lanai are shown in Table 4-2. They indicate that the resident population has remained fairly stable at just over 2,000 residents over the past 26 years (By way of comparison, the resident population was 3,720 in 1940 and 3,136 in 1950). Lanai City is the Island's only urban area and over 98 percent of the resident population live there.

Based on the population projections presented in the 1981 Lanai Community Plan-Technical Report, the population of the Island was forecast to increase from the present 2,100 to 2,200 up to 3,200 by the year 2000. This was based on a projection of 200 visitor accommodation units on Lanai by the year 2000. In the 1983 Lanai Community Plan Report, the resident population was projected to increase to 4,500 over the next 20 years as a planning guideline.

The average age of the population of Lanai is older than for other parts of the State and reflects an out-migration of younger adults and a typically older age for those employed in the pineapple industry.

With the recent completion of the hotel at Koele and the soon to be completed hotel at Manele, the population is expected to grow more rapidly than previously forecast. The population is now forecast to reach 3,000 residents by 1995 with the two hotels in full operation. The population is forecast to reach 4,500 people by 2020 assuming the development of additional hotel units up to the 650 units currently zoned for approval by Maui County.

There were a total of 650 housing units on the Island in 1980, with 3.3 people per household. Over 70 percent were built prior to 1940. An additional 144 housing units were added in 1989 in the Lalakoa III subdivision in the southeast part of Lanai City.

Table 4-1

POPULATION OF THE STATE OF HAWAII
1960-1987

YEAR	STATE	MAUI	KAUAI	OAHU	HAWAII
1960	632,772	42,855	28,176	500,409	61,332
1970	771,600	46,500	29,800	631,600	63,800
1980	968,900	71,600	39,400	764,800	93,000
1986	1,066,700	87,100	46,200	820,300	111,200
1987	1,082,500	89,900	47,600	830,600	114,400

Source: State of Hawaii, Department of Business and Economic Development, State Data Book, 1988, November, 1988.

Table 4-2

ISLAND OF LANAI RESIDENT POPULATION
1960-1987

YEAR	RESIDENT POPULATION
1960	2,115
1970	2,204
1980	2,199
1987	2,200

Source: State of Hawaii, Department of Business and Economic Development, State Data Book, 1988, November, 1988

A. Impacts

The anticipated increase in population on Lanai is not due to the proposed expansion of the Lanai Airport but is due to the development of tourist facilities and other developments on Lanai. Population growth will increase only indirectly because of employment opportunities created by expansion of the Airport.

B. Mitigation Measures

The housing needs of Lanai are being provided for by Castle & Cooke, Inc. through the investment of capital and the commitment of land for housing developments. The following describes the current status of the projects planned for Lanai:

- A 24-unit apartment complex (Lanai City Apartments). This project is presently under construction.
- A 128-unit apartment complex (Wailua Multi-family). The construction of this project is scheduled to start in June 1990.
- A 120-unit subdivision (Wailua Single-family) at the southwest side of Lanai City. This project is awaiting zoning approval.
- A 110 to 120 unit single-family subdivision to be developed by the County of Maui. Castle & Cooke, Inc. will donate the land for this project.
- 502 single-family units and 132 multi-family units are permitted in the Koele Project District Development.
- 342 single-family units and 74 multi-family units are permitted in the Manele Project District Development.
- Additional short-term (temporary) housing may be needed to accommodate workers during construction activities at the Airport.

4.2 ECONOMIC ACTIVITY

The principal economic activity on Lanai has historically been pineapple production. However, this is likely to change in the near future as the visitor industry begins to play a more important role in the economy of Lanai.

About 98 percent of the 90,000 acres on the Island are owned by Castle & Cooke, Inc.. The Dole Company, a subsidiary operates the pineapple plantation and is the only major employer on the Island. The Dole Company operates one of the world's largest pineapple plantations on the Island. With the shift in pineapple production to other countries and increased mechanization within the industry, the number of jobs in the pineapple industry in Hawaii and on Lanai have declined in recent years. The lack of job opportunities in recent years has resulted in a lot of people leaving Lanai, particularly young adults.

According to the September 1986, Environmental Assessment for the Manele Hotel (Phase I) and Park Area, prepared for the Lanai Company, the Dole Company is the Island's major employer with about 550 full-time and 500 seasonal workers. In 1984, the Lanai plantation produced about 210,000 tons of pineapple for shipment through Kaumalapau Harbor for processing in Honolulu. Dole currently cultivates about 12,000 acres on Lanai, compared to 14,000 acres a few years ago.

In 1986 there were an estimated 950 people employed on Lanai compared to 1,450 in 1976 and 1,100 in 1980. The percent of the civilian labor force estimated to be unemployed was 11.4 percent in 1986.

While it is expected that pineapple production will continue to be a major economic activity on Lanai, other developments are expected to supplement the economic growth of the Island in the near future. However, it should be noted that Castle & Cooke, Inc. owners and operators of the pineapple production properties have recently announced their intention to terminate their pineapple farming operations on Lanai within the next two years.

The 1983 Lanai Community Plan recommended that pineapple cultivation be maintained as the primary activity. The Plan recommended promoting the visitor industry as a secondary economic activity by providing sites for hotel development.

Other economic activity recommendations included the promotion of diversified agriculture, fishing and aquaculture industries, and job training programs for local residents.

The visitor industry will become a very significant part of the economy, employment and population growth on the Island within the next two years with the opening of the Koele and Manele Bay resorts. It is already having a major impact with the employment and economic activity currently generated by the ongoing construction of the hotels.

There are about 400 people presently employed in the construction of the new Koele and Manele Bay resorts, support facilities and housing development. This level is expected to continue until late 1990 and then decline with the opening of the Manele Bay hotel in early 1991. However, at that time employment associated with the operation of the hotels will increase. This is estimated to reach a level of over 700 employees with both resorts in operation.

There are many recreational activities available on Lanai. These include hunting, hiking, fishing, camping, snorkeling, swimming, golf, etc. There is also a small boat harbor at Manele Bay. However, there are limited visitor facilities available at present. Until recently there were only 10 hotel rooms on the Island at the Hotel Lanai. With the opening of the new hotel at Koele, 102 rooms are now available to visitors.

Based on discussions with representatives of the Lanai Company, there will be another 250 units opening at the Manele Bay hotel early in 1991. Both hotels are expected to be destination resorts with an average length of stay of seven (7) days. In addition to the hotel units, a total of 75 condominium units are to be developed but are not expected to be generally available for rent.

It is expected to take several years for the visitor level to stabilize at a hotel occupancy rate comparable to those experienced at similar visitor resorts and destination areas on other Islands. Therefore, while the Lanai Company has zoning approval from Maui County for

additional units at both resorts, these additional units are not expected to be developed until after the year 2000.

Based on an average seven (7) day length of stay and two visitors per room, the initial 350 hotel units would generate about 18,000 visitors per year with a 50 percent occupancy rate, and about 27,000 visitors per year with a 75 percent occupancy rate. With a total of 650 units, at 75 percent occupancy rate, the visitor level would reach about 50,000 annually.

A. Impacts

Expansion of the Lanai Airport will create some additional jobs. Short-term construction employment and indirect construction-related employment will add to the Island's economy during the course of construction.

Some long-term permanent employment for additional airport-related facilities will be generated.

More visitors are expected because of the development of new resorts on Lanai and the Airport will be able to accommodate the demand for both visitor and resident travel with the proposed airport improvements. The new visitor attractions will result in new employment in the visitor industry.

Expansion of the Airport will result in the loss of a relatively small percent of the land used for pineapple production.

B. Mitigation Measures

The housing needs currently being addressed are discussed in the previous section.

The Airport serves as a major transportation facility for both local residents and visitors. Expansion of the Airport will serve the forecast increase in economic activities and employment opportunities on Lanai. Expansion of the Airport, as proposed in the Master Plan, will provide for a more efficient, reliable and convenient transportation facility for the movement of both passengers and cargo to and from Lanai.

Large acreages of currently uncultivated fields can be recultivated to replace those areas lost from pineapple production because of the expansion of the Airport.

SECTION 5

SECTION 5

IMPACTS ON PUBLIC FACILITIES AND SERVICES

This section describes the impacts on public facilities and services including the Airport support and utility systems.

5.1 ACCESS CIRCULATION AND PARKING

5.1.1 ACCESS ROAD

At the present time, the only major roadway on Lanai is Kaumalapau Highway, a State Highway, that connects Lanai City to Kaumalapau Harbor. In the future, a second road may be built to the south of the Airport for traffic that will be generated by the development at Manele.

The existing Lanai Airport access road is approximately 0.6 of a mile long and extends from Kaumalapau Highway to the Airport as shown on Figure 2-1. The width of the existing pavement is only 18 feet and the shoulders are narrow in many places. The condition of this road is good and its capacity is adequate for the present traffic demand. The most recent traffic survey was taken in April of 1988 by the State Highways Division at the intersection of Kaumalapau Highway and the access road. The average daily traffic figures are shown on Table 5-1.

It is anticipated that the traffic volume will increase in proportion to the increase in air passenger traffic. The increase in traffic volume, based on this projection, is estimated to be 250 percent over the 1988-2005 planning period or an average of 5.5 percent annually. This will result in a combined two-directional traffic on the access road of about 1,800 vehicle trips per day in 2005 as compared to 522 in 1988. The peak-hour traffic is expected to increase to about 360 vehicle trips per hour in 2005.

The ability of the Kaumalapau Highway/Access Road intersection to accommodate the forecast traffic demand was analyzed using the procedures outlined in the Highway Capacity Manual (Transportation Research Board, 1985). In conducting the analysis, it was assumed that non-airport-related traffic on Kaumalapau Highway would increase at the same rate as the Airport-related traffic. These analyses indicated that the existing intersection can provide acceptable levels of service (LOS "A") for the projected 2005 traffic. The design consultant will prepare a detailed traffic study to confirm these analyses.

5.1.2 TERMINAL ROADS AND PARKING

The existing roads in the terminal area are essentially traffic lanes for the parking lot. Traffic circulation is therefore poor. There is a total of 47 parking stalls; 35 for the public, 6 for employees and 6 for loading and unloading at the terminal curbside. In recent years, the increase in activities has caused congestion and inconvenience at the Airport. During peak periods, the parking lot is full and people are forced to park in the adjoining pineapple fields. The State plans to construct some interim improvements in 1990 to provide some temporary relief.

Table 5-1

1988 AVERAGE DAILY TRAFFIC AT INTERSECTION OF KAUMALAPAU HIGHWAY AND LANAI AIRPORT ACCESS ROAD

Direction	Total
From Lanai City	601
To Lanai City	551
From Kaumalapau Harbor	298
To Kaumalapau Harbor	276
From Lanai Airport	262
To Lanai Airport	260

Source: Department of Transportation, Highways Division

A. Impacts

As traffic along the Airport access road increases, roadway safety will become a greater concern. For example, the lack of adequate shoulder widths and narrow roadway width will make emergency stops more hazardous.

The expansion of the terminal area, and the development of new terminal facilities, will require new roads and parking facilities.

B. Mitigation Measures

The Airport Access Road will be widened and improved to State Highway design standards.

A separate left turn storage lane is proposed at the Kaumalapau Highway/ Airport access road intersection for Airport traffic from Lanai City. This will provide safer left turns and enhance the flow of traffic through the intersection.

The Master Plan will provide ample parking facilities for the projected needs of the Airport.

Roadways within the terminal area will be designed in a loop configuration to optimize traffic circulation. In general, the roads will be designed for one-way traffic to minimize conflicts. An additional curbside parking lane will be provided for loading and unloading at the passenger terminal. This will help to minimize congestion along the curbside road.

5.2 POTABLE WATER SUPPLY

The water system for Lanai is owned and operated by the Dole Company. The Lanai Airport water system is a part of the domestic water supply system for Lanai City. Water is transmitted to the Airport through an existing 6-inch pipeline along Kaumalapau Highway and a 2-1/2 inch pipe from the highway to the Airport. The capacity of these lines is adequate for the present domestic demands but not for fire.

A. Impacts

The expansion to the terminal facilities will increase the demand for water at the Airport. In terms of the average domestic water requirements, the demand may increase to about 0.1 million gallons per day. (The actual demand may be less depending on factors such as irrigation requirements for landscaping.) In addition to the domestic demand, there will be a greater need for an adequate supply of water for fire protection.

B. Mitigation Measures

The following mitigation measures will be considered in the design of the terminal facilities to minimize the increase in demand on the groundwater resource:

- Installing flow restriction and/or pressure regulating devices.
- Using drip irrigation design for the landscape irrigation system where possible.
- Using landscaping plant materials that require less water.

5.3 WASTEWATER TREATMENT AND DISPOSAL

The wastewater generated at the Lanai Airport is treated and disposed of in two (2) cesspools located near the main terminal building as shown on Figure 2-4. However, beginning in 1991, new State Health Department regulations will prohibit the use of cesspools. In order to comply with the new regulations, other methods of treatment and disposal will be required.

The Department of Public Works, County of Maui, has advised the Airports Division that the State should not plan on treating sewage from Lanai Airport at the County's Lanai City treatment plant. The State must therefore provide its own wastewater treatment facility at the Airport.

A. Impacts

The volume of wastewater generated at the Airport is expected to increase in proportion to the increase in air passenger traffic. A wastewater facility capable of treating flows at an estimated peak rate of about 60,000 gallons per day will be required.

B. Mitigation Measures

A design based on soil absorption technology will be investigated. Other treatment methods will be considered as necessary.

5.4 STORM DRAINAGE

The Lanai Airport is ideally situated on relatively high ground along the western rim of Miki Basin. The natural terrain of the surrounding area generally slopes away from the Airport in the westerly direction towards Kalamaiki Gulch or to the southeast towards Miki Basin.

The airfield drainage system consists of pipe culverts that cross the runway and longitudinal swales constructed along the edges of the grassed shoulders. Storm water from the terminal area drain by surface flow to the pipe culverts within the airfield as shown on Figure 2-3. In general, most of the storm runoff from the Airport flows into Miki Basin.

B. Mitigation Measures

The new power plant in Miki Basin and the improvements planned to the transmission line along Kaumalapau Highway will provide sufficient capacity to meet the demands of the Airport. The capacity of the emergency generator system will be increased to 75 KW.

5.5.2 TELEPHONE SYSTEM

The Hawaiian Telephone Company (HTCO) provides telephone service to all of Lanai. Because of the resorts and other related developments on Lanai, HTCO is increasing the capacity of its telephone facilities within Lanai City and in Miki Basin. The telephone company has already installed some of the facilities in the Miki Basin area; namely, the telephone cables along Miki Road from Kaumalapau Highway to MECO's power plant.

The telephone lines in the immediate vicinity of the Lanai Airport consist of 25 pairs of aerial cables located along Kaumalapau Highway. All but one of these 25 pairs are currently in use. HTCO plans to increase the capacity of this system in 1990 by installing additional cables.

The existing telephone lines to the Lanai Airport consist of 50 pairs of direct-buried cables along the Lanai Airport Access Road. Of these, only 14 pairs are currently in use.

A. Impacts

The proposed Master Plan facilities will increase the demand for telephone service.

B. Mitigation Measures

The improvements planned by HTCO will provide sufficient capacity to meet the increase in telephone service requirements.

5.6 FUEL STORAGE

At present, no on-site fuel storage is available for aircraft or for ARFF equipment.

A. Impacts

With the increase in activity forecast for Lanai Airport, there may be a need for a fueling facility in the future.

B. Mitigation Measures

Fuel storage space will be provided in the Airport support area to the west of the new passenger terminal building.

5.7 POLICE SERVICES

The Maui County Police Department provides only limited security at Lanai Airport. This involves police officers making regular visits to the Lanai Airport on Mondays and Fridays to oversee the arrivals and departures of construction workers. Off-duty police officers also

provide security on an "on call" basis. Security in areas closed to the public, such as the aircraft parking apron, is handled by the Department of Transportation (DOT) Airport Operations Control (AOC) personnel.

A. Impacts

With the increase in activity at Lanai Airport, there will be a need to enhance Airport security. In addition to more personnel and equipment, more stringent security measures and procedures will be required.

B. Mitigation Measures

The State will prepare a security plan in accordance with Federal regulations and guidelines. Said plan will include a computerized badging program and security personnel/equipment to control access into restricted areas.

5.8 AIRCRAFT RESCUE AND FIREFIGHTING FACILITIES

The two firefighting trucks which comprise the Airport's Aircraft Rescue and Firefighting (ARFF) facilities occupy a 2,160 square foot building adjacent to the passenger terminal. The Quick Response vehicle carries 500 gallons of water and 500 pounds of dry chemical; also available is a skid-mounted truck with 450 pounds dry chemical and 100-gallon premix systems, both operated by nitrogen. The County Fire Department is also available to respond to airport emergencies; however, no formal mutual aid agreement is in effect at the present time.

A. Impacts

Additional personnel and equipment will be required with the forecast increase in aircraft operations. This will involve improvements to the present ARFF facility.

B. Mitigation Measures

Ample space will be provided for future expansion of the existing ARFF facility.

5.9 MEDICAL SERVICES

Lanai's only hospital is located in Lanai City. There is just one doctor and a public health nurse who provide for most of the medical needs on the Island. The Department of Education has one nurse's aide assigned to the school. Medical services not available on Lanai are provided by quasi-governmental agencies on a transient basis once or twice a month. In general the existing medical facilities and services are inadequate.

A. Impacts

An aviation accident at Lanai Airport will have a significant impact on the medical facilities on Lanai. The potential for an accident to occur will increase as the number of aircraft operations increase.

B. Mitigation Measures

Mitigation measures do not fall within the scope of this project. The medical needs impact the Lanai Community as a whole and must be addressed by other governmental bodies and private interests.

5.10 SOLID WASTE COLLECTION AND DISPOSAL

Solid wastes are presently collected in eight (8) 30-gallon containers. State Transportation maintenance personnel gather the waste materials daily and haul them to the County landfill located approximately 3/4 of a mile from the Lanai Airport. The existing landfill is nearing its capacity and must be replaced in the near future. The County has tentatively selected a new site 3 miles west of Lanai City and 3 miles north of the Lanai Airport. A negative declaration for this site has been filed with the Office of Environmental Quality Control and is presently under governmental review.

A. Impacts

Based on the projected increase in airport activities, the volume of solid waste materials generated at the Airport will increase significantly.

B. Mitigation Measures

Additional staff, equipment and space will be provided as required.

SECTION 6

SECTION 6

RELATIONSHIP TO PLANS, POLICIES AND CONTROLS

This section describes the relationship to Federal, State and County plans, policies and controls.

6.1 FAA REQUIREMENTS

The land acquisition, construction of the runway extension and associated taxiways, new terminal area buildings and aircraft parking aprons, access roadway and parking improvements, infrastructure and support facilities requires the approval of the Airport Layout Plan by the Federal Aviation Administration. The proposed Airport Layout Plan as shown on Figure 6-1 has been reviewed by FAA.

The Airport Layout Plan (ALP) drawing shows the existing, proposed, relocated, and ultimate (long-range) airport facilities. The major airfield recommendations on the ALP consist of a 2,000-foot extension of Runway 3-21 at the northeast end.

The Approach and Clear Zone Plan for the proposed airport layout is presented in Figure 6-2. The Approach and Clear Zone Plan is a graphic illustration of the imaginary surfaces as defined in the Federal Aviation Regulations (FAR) Part 77, "Objects Affecting Navigable Airspace." The purpose of the Approach and Clear Zone Plan is to identify existing and ultimate approach slopes as well as surrounding physical features and community locations which may affect aircraft operations. The primary objectives in establishing the imaginary surfaces of approach and runway protection zones are to identify surrounding terrain or objects that penetrate the imaginary surfaces, regulate the height of development near the Airport, and prevent the erection of possible obstructions to navigable airspace.

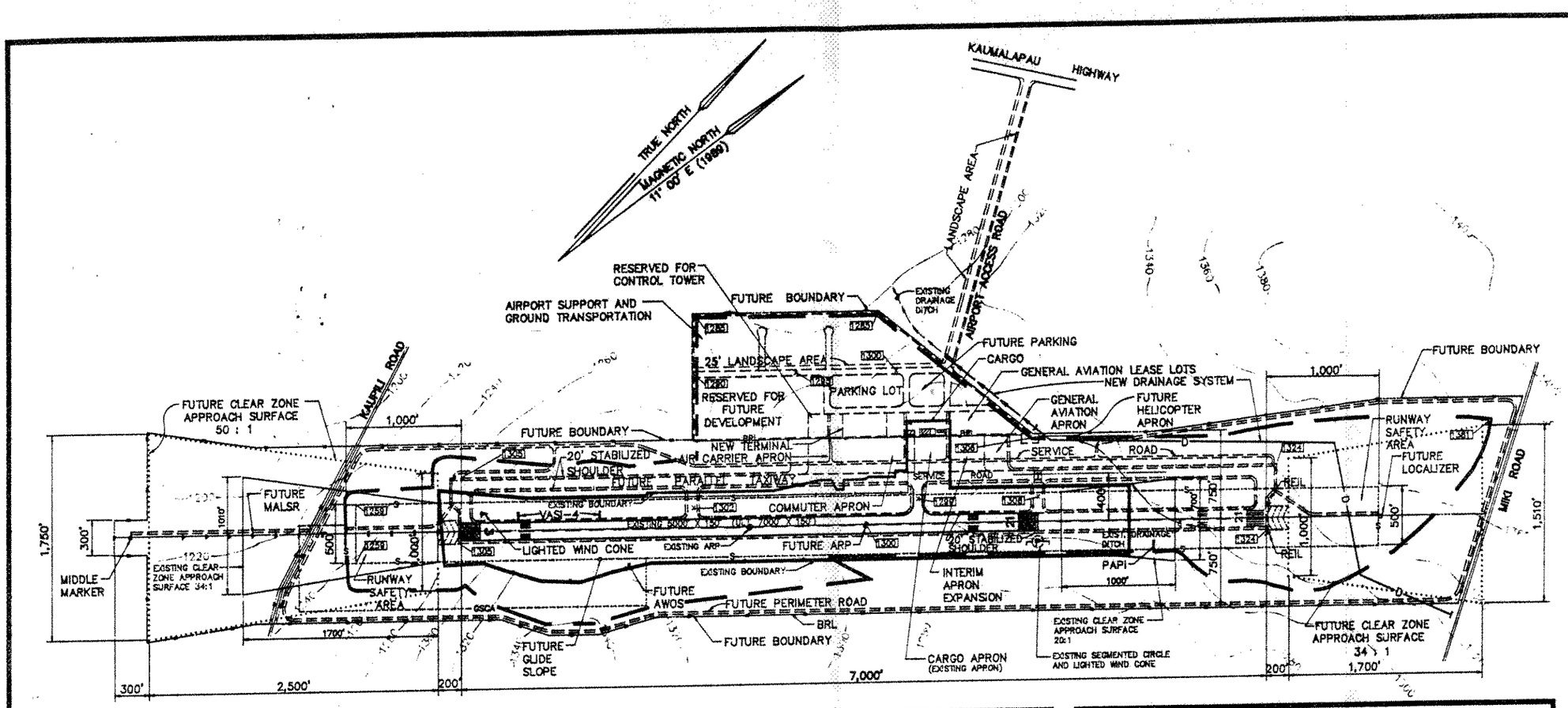
6.2 HAWAII STATE PLAN

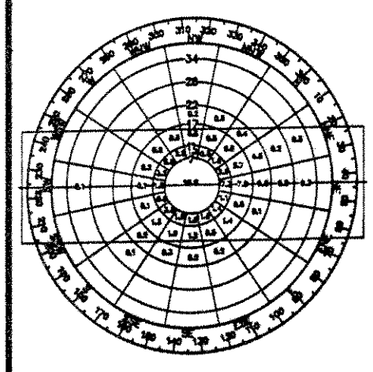
The Hawaii State Plan was developed to serve as a guide for future development of the State of Hawaii. The Plan identifies, in general, the goals, objectives, policies and priorities for the development and growth of the State. The Plan provides guidelines that will help to complement the overall development of the State and its people.

The proposed expansion of the Lanai Airport is generally consistent with the objectives and policies of the Hawaii State Plan. The following describes the compatibility of the proposed project in relation to the various elements of the Hawaii State Plan.

6.2.1 POPULATION (HRS SECTION 226-5)

Expansion of the Lanai Airport will serve the forecast increase in economic activities and employment opportunities for the Island of Lanai. This increase in the economy will complement the projected population growth for the Island by providing additional employment opportunities. The expansion of the Airport will only indirectly increase population growth because of the increased economic activity.





COVERAGE

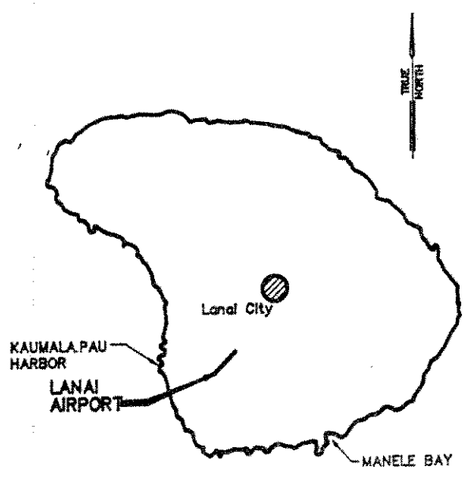
R/W 3–21
98.3% FOR 15 KNOTS
CROSSWIND

SOURCE

LANAI AIRPORT
JANUARY 1965 – DECEMBER 1965

WIND ROSE

SCALE IN KNOTS



LOCATION PLAN

LEGEND

	EXISTING	ULTIMATE
AIRPORT BOUNDARY		
BUILDING RESTRICTION LINE		BRL
BUILDINGS		
BUILDINGS TO BE REMOVED OR RELOCATED		
FACILITIES		
APPROACH SURFACE		
FENCE LINE		
GROUND CONTOURS	1300	1310
AIRPORT REFERENCE POINT		
BLAST PADS		
GUIDE SLOPE CRITICAL AREA		GSCA

AIRPORT DATA

		EXISTING	ULTIMATE
AIRPORT REFERENCE POINT (ARP) COORDINATES	LAT	20° 47' 20" N	20° 47' 22" N
	LONG.	156° 57' 15" W	156° 57' 13" W
NORMAL MAXIMUM TEMPERATURE–HOTTEST MONTH		84° F	SAME
AIRPORT ELEVATION		1308'	1324'
AIRPORT AND TERMINAL NAVIGATIONAL AIDS		VORTAC BEACON LIGHT VASI MRL	SAME SAME SAME HIRL MITL ILS MALSR REIL AWOS PAPI
AIRPORT AREA (ACRES)		91	520

RUNWAY DATA

		EXISTING		ULTIMATE	
RUNWAY		3	21	3	21
APPROACH SURFACES (FAR PART 77)		34 : 1	20 : 1	50 : 1	34 : 1
RUNWAY SAFETY AREAS		NONE	NONE	YES	YES
NAVIGATIONAL AND VISUAL AIDS		VASI–4	NONE	SAME	PAPI, REIL
EFFECTIVE GRADIENT (%)		0.08		0.27	
WIND COVERAGE (%) (15 KNOTS)		98.3		SAME	
INSTRUMENT RUNWAY		NONPRECISION	NO	PRECISION	NONPRECISION
RUNWAY LIGHTING		MIRL		HIRL	
RUNWAY MARKING		NONPRECISION INSTR.		PRECISION INSTR.	
PAVEMENT STRENGTH (IN 1,000 LBS.)	(S)	45		60	
	(D)	70		190	
	(DT)	110		350	
RUNWAY GROOVING		NONE		7000' X 150'	
RUNWAY DIMENSIONS		5000' X 150'		7000' X 150'	
AIRCRAFT DESIGN GROUP		II		II	

NOTES:

1. ORIGIN OF COORDINATES AND AZIMUTHS:
   "PUU MANU" (1879–1927)
   GEOGRAPHIC POSITION 20° 46' 47.214" LAT
   156° 52' 20.960" LONG.
   OLD HAWAII DATUM 429,888.85 X
   (ZONE 2) 162,192.63 Y
2. ALL ELEVATIONS REFERENCED TO MEAN SEA LEVEL (MSL).
3. ALL AZIMUTHS MEASURED CLOCKWISE FROM TRUE SOUTH.
4. THIS DRAWING IS FOR PLANNING PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION OR NAVIGATIONAL PURPOSES.
   THE PREPARATION OF THIS EXHIBIT WAS FINANCED IN PART THROUGH AN AIRPORT IMPROVEMENT PROGRAM GRANT FROM THE FEDERAL AVIATION ADMINISTRATION UNDER THE PROVISION OF SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982.

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

AIRPORT LAYOUT PLAN

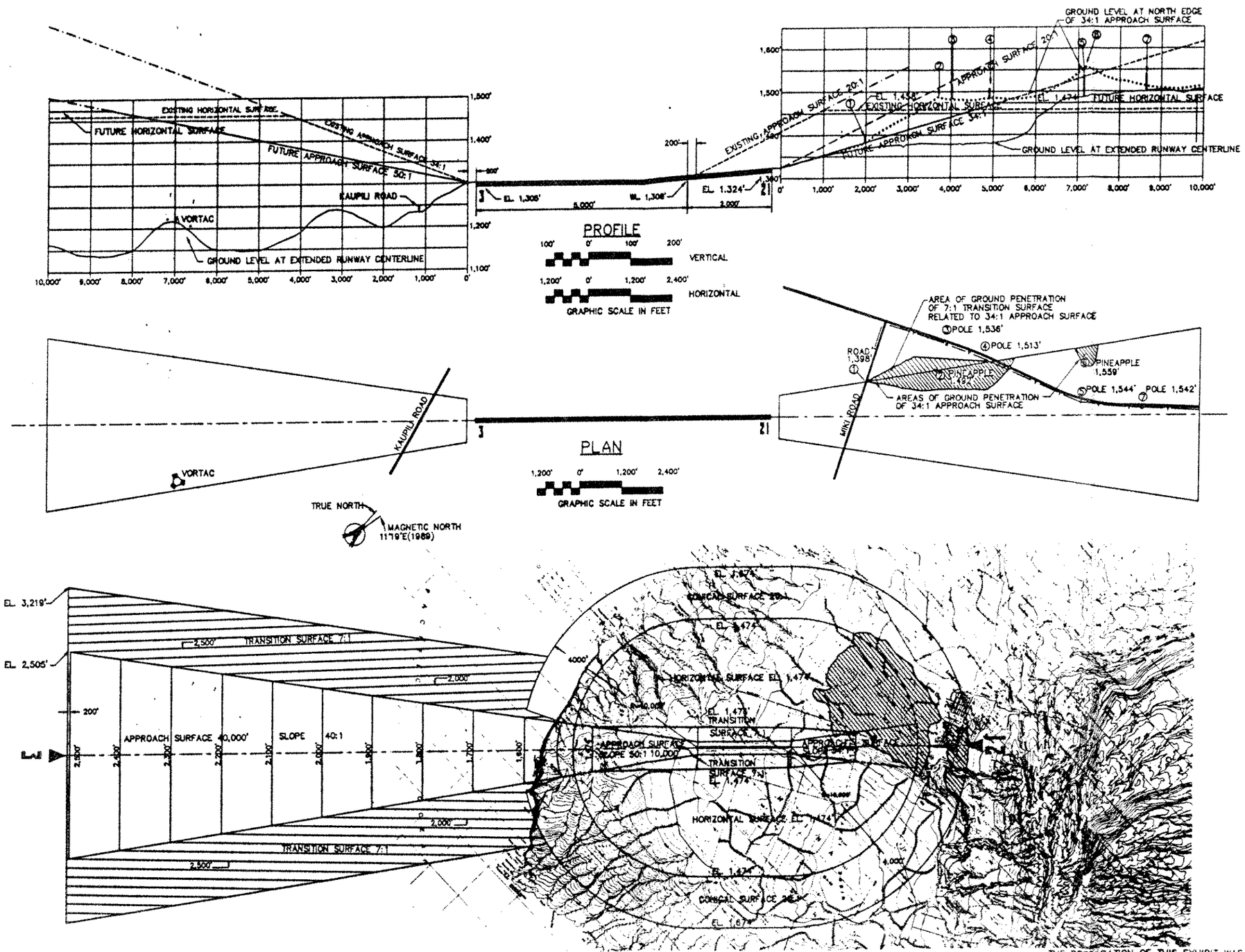
GRAPHIC SCALE IN FEET

ParEn, Inc. dba
PARK ENGINEERING

DATE:

DWG. NO.

FIGURE 6–1



NOTE:

THIS DRAWING IS FOR PLANNING PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION OR NAVIGATIONAL PURPOSES.

THE PREPARATION OF THIS EXHIBIT WAS FINANCED IN PART THROUGH AN AIRPORT IMPROVEMENT PROGRAM GRANT FROM THE FEDERAL AVIATION ADMINISTRATION UNDER THE PROVISION OF SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982.

Airports Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

LANAI AIRPORT MASTER PLAN

ISLAND OF LANAI

STATE PROJECT NO.
AIP PROJECT NO.

APPROACH AND CLEAR ZONE PLAN

ParEn, Inc. dba
PARK ENGINEERING

DATE:

DWG. NO.

FIGURE 6-2

6.2.2 ECONOMY (HRS SECTION 226-6 THROUGH 10)

The proposed project will create employment opportunities that will benefit the economy of Lanai. Short-term construction employment and long-term Airport-related and Airport support facility employment will be available.

Expansion of the Airport will serve the growth of the visitor industry by accommodating additional interisland and general aviation activity to accommodate the projected tourist and population growth.

Federal funding for many of the proposed projects is probable. The Federal government may contribute up to 90 percent of the construction cost for the proposed runway extension and 75 percent of public areas of the terminal expansion. Certain navigational aids are eligible for 100 percent Federal funding.

6.2.3 PHYSICAL ENVIRONMENT (HRS SECTION 226-11, 12, 13)

The Airport serves as a major transportation service facility for both local residents and visitors. Expansion of the Airport will serve future development on the Island. The effects of noise exposure from aircraft operations, however, may limit certain types of urban development outside the Ldn 65 noise contours, but under the aircraft flight tracks, particularly to the north of the Airport.

6.2.4 TRANSPORTATION (HRS SECTION 226-17)

The proposed project will provide for a more efficient and convenient transportation facility for the movement of both passengers and cargo. The project is designed to accommodate the present and future air transportation needs of the Island.

6.3 STATE FUNCTIONAL PLANS

The twelve State Functional Plans were adopted by the State Legislature. These plans were formulated to specify in greater detail the policies, guidelines and priorities set forth in the Hawaii State Plan. The twelve functional plans include Energy, Transportation, Water Resources, Historic Preservation, Recreation, Health, Education, Housing, Conservation Lands, Higher Education, Agriculture and Tourism.

The proposed Airport expansion helps to achieve some of the goals of the functional plans as described below.

6.3.1 STATE ENERGY FUNCTIONAL PLAN

The new buildings at the Lanai Airport will be designed to help conserve energy.

6.3.2 STATE TRANSPORTATION FUNCTIONAL PLAN

The Lanai Airport Master Plan Report, April 1990, was developed to be consistent with the objectives of the Statewide Airport System Plan. The Master Plan projects expansion and improvements to the year 2005. It also takes into consideration potential expansion of the Airport beyond the year 2005.

Major expansion of the Lanai Airport includes the extension of the runway and additional terminal facilities to accommodate interisland passenger and cargo operations. Additionally, the facilities on the Airport proper have been rearranged and expanded, by function, to provide greater efficiency in Airport operations. This arrangement is intended to eliminate the mix of small and large aircraft on the apron as presently occurs.

Air cargo facilities have been expanded and combined into one building. A new road to these facilities at the base of the Airport access road separates traffic to the air cargo facilities from traffic to the passenger terminal area.

Airport access road; public, rental car and employee parking facilities; and ground transportation support facilities are also being expanded to accommodate the future aviation demands.

6.3.3 STATE HISTORIC PRESERVATION FUNCTIONAL PLAN

An archaeological survey was conducted in the areas planned for expansion of the Lanai Airport. The research indicated that the project area was utilized during traditional times for agriculture and probably associated habitation. Subsequent commercial pineapple cultivation has homogenized the landscape to such a degree that it is doubtful any subsurface cultural features still exist within the project area. In the unlikely event a subsurface feature is unearthed during construction activities, "on-call" monitoring by a qualified archaeologist is recommended. Any sites found will be recorded and/or archaeologically excavated to retrieve any information of significance.

6.3.4 STATE HEALTH FUNCTIONAL PLAN

New State Health regulations will prohibit the use of cesspools for wastewater disposal. A new wastewater treatment facility will be constructed to comply with the proposed regulations. This action will eliminate the indiscriminate discharge of untreated raw sewage into the subterranean environment.

A Noise Compatibility Program was prepare to evaluate land use compatibility in the airport environs exposed to noise generated by aircraft operations. Because much of the surrounding lands are undeveloped, the noise compatibility program emphasized measures for maintaining land use compatibility in the Airport environs in the future.

6.3.5 STATE CONSERVATION LANDS FUNCTIONAL PLAN

The proposed project is situated on State Agricultural land. A petition will be filed with the State Land Use Commission to reclassify the additional Airport land from Agricultural to Urban.

Studies conducted indicated no rare or endangered plant or animal species in the areas proposed for expansion of the Airport.

The land consists mostly of silty clay loams.

6.3.6 STATE TOURISM FUNCTIONAL PLAN

Expansion of the Lanai Airport will allow air carrier operators to increase the number of interisland flights to accommodate the demands of the visitor industry expected with the opening of two hotels starting in 1990. General aviation operations will also increase with the added airfield and terminal area facilities. The expanded Airport will serve as a major support facility, transporting passengers and cargo, to the growing visitor industry on Lanai.

According to FAA design guidelines and air carrier input, the existing runway is inadequate to accommodate interisland jet aircraft and general aviation business jets at their maximum certificated takeoff weights. Extension and strengthening of the runway will remove these restrictions.

6.3.7 STATE AGRICULTURE FUNCTIONAL PLAN

Some land will be lost from pineapple production with expansion of the Airport. This loss should not have significant impact on pineapple production since Dole has large acreages of uncultivated fields that can be recultivated. In addition, it should be noted that Castle & Cooke, Inc. have recently announced their intention to terminate their pineapple farming operations on Lanai within the next two years.

The proposed Airport improvements (e.g., airfield and cargo facilities) will facilitate the movement of agricultural produce to and from the Island.

6.3.8 STATE RECREATION FUNCTIONAL PLAN

The improved Airport facilities will provide greater operational reliability for air carrier, commuter/air taxi and general aviation users of the Airport. This will enhance recreational opportunities for both visitors to Lanai as well as for local residents wishing to travel off-Island.

6.3.9 STATE EDUCATION AND HIGHER EDUCATION FUNCTIONAL PLANS

The improved Airport facilities will provide greater operational reliability for air carrier and commuter/air taxi service to and from the Lanai. This will enhance the opportunities for educational and other interactions (e.g., academic and sports) between Lanai students and students on other Islands.

6.4 STATE LAND USE LAW

The proposed Lanai Airport expansion is situated in a State Land Use Agricultural District. The State of Hawaii Department of Transportation will petition the Land Use Commission for a District Boundary Amendment to reclassify the property to be acquired as Urban for expansion of the Airport.

6.5 LANAI COMMUNITY PLAN

The Lanai Community Plan (LCP) contains policies for the long-range comprehensive development of the Island of Lanai. Expansion of the Lanai Airport is consistent with the overall objectives of the Lanai Community Plan.

The expected growth in the visitor industry will be served by the expansion of the Airport. Even the present demand results in congestion and operating inefficiencies at Lanai Airport at times. Expansion of the Airport will provide for a more efficient movement of passengers and cargo to and from the Airport by both air and ground transportation.

Expansion of the Lanai Airport will create several job opportunities. Short-term construction employment and long-term airport-related and airport support employment will be available. The increase in employment opportunities will provide Lanai residents a wider range of employment opportunities.

The proposed expansion of Lanai Airport will be consistent with the Lanai Community Plan. However, the LCP must be amended.

6.6 MAUI COUNTY ZONING

Since the Airport is on State Agricultural land, there is no County zoning and the provisions of the County Interim Zoning Ordinance do not apply. The County Planning Department has indicated that a change in zoning will be required for the Airport. Upon the approval of the District Boundary Amendment to Urban by the State Land Use Commission and the LCP amendment by the County, all zoning matters will be governed by the provisions of the County Interim Zoning Ordinance.

6.7 COASTAL ZONE MANAGEMENT/SPECIAL MANAGEMENT AREA HRS CHAPTER 205A

The Lanai Airport is not within the Shoreline Management Area. The proposed expansion of the Lanai Airport will not impact the coastal resources of the area, nor will the proposed development preclude access to recreational opportunities. Any historic, scenic and open space resources within the Airport boundaries will be preserved. However, they will not be open to the public because of public safety and security reasons. The Lanai Airport buildings are outside of the tsunami inundation zone.

A Special Management Area Permit is not required.

SECTION 7

SECTION 7

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Improvements proposed as part of the Lanai Airport Master Plan are recommended for construction in two phases over the 20-year planning period. Certain measures must be implemented during the construction period to ensure that no adverse impacts on the environment are generated. The measures include:

- Control of dust during the grading and construction phases
- Rerouting of natural drainage ways leading to the permanent realignment of drainage channels with sufficient capacity to handle potential surface water flows so as to avoid flooding on the Airport site and not to impede the irrigation system of the surrounding pineapple fields
- Schedule construction activities to control and minimize soil erosion

Implementation of the proposed Plan is expected to enhance the long-term productivity and goals of Lanai by providing an Airport facility capable of accommodating the air transportation requirements of the Island through the 20-year planning period and beyond.

The proposed improvements planned for the Lanai Airport are within lands either currently owned or recommended for acquisition by the State of Hawaii to be set aside for use by the Department of Transportation for Airport purposes. Aside from the areas that are either currently developed or recommended for development the remaining lands within the Airport property will remain in an undeveloped state.

The further expansion of the Airport will eliminate the option of developing these lands for other purposes. Because of noise concerns, any proposed development of lands in close proximity to the Airport and under the aircraft flight tracks will require review to ensure compatibility with Airport and aircraft operations.

The extension of the Airport's runway to the northeast will limit the types of development surrounding the Airport to those that are compatible with airport operations and to those that are not noise sensitive. The expansion of the Airport will thus impact the use of adjacent land.

The proposed expansion to Lanai Airport will require that the State acquire additional land currently owned by Castle & Cooke, Inc. At the present time, most of the land to be acquired, approximately 390 acres, is in pineapple cultivation. The acquisition and development of this land for Airport use will remove this land from pineapple production and foreclose future options of developing this area for other purposes.

One of the recommendations of the Noise Compatibility Program is to provide the mechanisms for preserving and maintaining land use compatibility for a second runway alignment should one every be needed. This will involve imposing land use controls that restrict noise sensitive developments in those areas to the north and south of the Airport that could have noise impacts from the second runway alignment.

SECTION 8

SECTION 8

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The principal irreversible and irretrievable commitment of resources that would result from implementing the recommended improvements at Lanai Airport is the loss of 390 acres of agriculturally productive land. Once this area is paved over for airfield or terminal area use, it is permanently lost to agricultural use.

Other resources that would be lost if all improvements are implemented as proposed include the materials (cement, gravel, asphalt, timber, etc.) necessary to construct the improvements. Although the materials needed for grading and fill operations can be obtained locally by balancing the cut and fill within the expanded Airport, other construction materials will have to be imported from Oahu or elsewhere.

The proposed action will commit construction materials, energy, human resources and money to the project. The land area to be used for the Airport will be committed to such use for an indefinite period of time.

SECTION 9

SECTION 9

LIST OF INDIVIDUALS, ORGANIZATIONS AND AGENCIES CONTACTED AND TO BE CONSULTED

FEDERAL

Department of Transportation
- Federal Aviation Administration - Airports Division

Department of Defense

Department of the Interior
- U.S. Fish and Wildlife Service

Department of Agriculture
- Soil Conservation Service

Federal Emergency Management Association

STATE

State Land Use Commission
Department of Land and Natural Resources
Department of Transportation
Department of Business, Economic Development and Toruism
Department of Agriculture
Department of Health
Office of Environmental Quality Control
Department of Accounting and General Services
Lanai High and Elementary School
Lanai Community Hospital

COUNTY OF MAUI

Office of the Mayor
County Council
Department of Water Supply
Department of Public Works
Planning Department
Office of Economic Development
Fire Department
Police Department

INDIVIDUALS AND ORGANIZATIONS

Air Molokai
Airline Pilots Association
Aloha Airlines
Aloha Island Air
Castle & Cooke, Inc.
Dole Foods Company
Dollar Rent-A-Car
Hawaiian Airlines
Hutchinson Air
Honolulu Airlines Committee
Interisland Air
Lanai Company, Inc.
Maui Electric Company, Ltd.
Oshiro's Service and U-Drive
Polynesian Airways
Hawaiian Telephone Company
Lanaian

SECTION 10

SECTION 10

LIST OF PREPARERS

Park Engineering
Suite 300, Kawaiahao Plaza
567 South King Street
Honolulu, Hawaii 96813

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10 Twin Dolphin Drive, R-404
Redwood City, California 94065

Mr. R. John Sanders, P.E.
Mr. Thomas R. Elliott, Sr.
Mr. George W. Antis
Ms. Judith F. Comperchio

Y. Ebisu & Associates, Inc.
1126 Twelfth Avenue, Room 305
Honolulu, Hawaii 96816

Mr. Yoichi Ebisu, P.E.

Cultural Surveys Hawaii

Mr. Douglas F. Borthwick, B.A.
Mr. Rodney Chiogioji
Dr. Hallett H. Hammatt, Ph.D.

Char & Associates

Ms. Winona P. Char
Mr. W. Arthur Whistler

Applied Research Group
Bishop Museum

Mr. Aki Sinoto

SECTION 11

SECTION 11

PREPARATION NOTICE COMMENTS RECEIVED AND RECORD OF PUBLIC HEARING

1. Letter dated December 28, 1989 from the FAA to the Department of Transportation.
2. Letter dated January 12, 1990 from the Land Use Commission to Park Engineering.
3. Memorandum dated January 23, 1990 from the State Historic Preservation Program to OCEA.
4. Memorandum dated February 6, 1990 from the Board of Land and Natural Resources to the Department of Transportation.
5. Transcript of Proceedings (for public hearing).
6. Attendance Sheet (for public hearing).
7. Testimony Sign-In (for public hearing).

U.S. Department
of Transportation
**Federal Aviation
Administration**

AIRPORTS DISTRICT OFFICE
BOX 50244
HONOLULU, HI 96850-0001
Telephone: (808) 541-1230

December 28, 1989

Mr. Edward Y. Hirata
Director of Transportation
State of Hawaii, DOT
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Hirata:

We have reviewed the Environmental Assessment (EA) for Lanai Airport transmitted by your December 20, 1989, letter. The letter notes that DOT has determined an EIS will be prepared with this EA serving as the EIS Preparation Notice.

Due to the short deadline, our only comment on the EA is to expand the Alternatives Considered (page 23) to describe in more detail the investigated alternatives and the reasons for rejection. A more thorough review will be made of the EIS when prepared.

Sincerely,

Daniel S. Matsumoto

For Henry A. Sumida
Airports District Office Manager

cc:
Owen Miyamoto
✓Dean Nakagawa

STATE OF HAWAII

DEPARTMENT OF BUSINESS
AND ECONOMIC DEVELOPMENT

LAND USE COMMISSION

Room 104, Old Federal Building, 335 Merchant Street
Honolulu, Hawaii 96813 Telephone: 548-4611

JOHN WAIHEE
Governor

RENTON L.K. NIP
Chairman

FREDERICK P. WHITTEMORE
Vice Chairman

COMMISSION MEMBERS:

Lawrence F. Chun
Sharon R. Himeno
Allen K. Hoe
Allen Y. Kajioka
Eusebio Lapenia, Jr.
James M. Shinno
Elton Wada

ESTHER UEDA
Executive Officer

January 12, 1990

Mr. Reggie Suzuka
Paren, Inc.
567 South King Street, Suite 300
Honolulu, Hawaii 96813

Dear Mr. Suzuka:

Subject: EIS Preparation Notice for Lanai Airport Improvements, TMK: 4-9-02:01, 41, 46 & 47

This is to request to be a consulted party for the above subject matter.

Sincerely,

ESTHER UEDA
Executive Officer

EU:to

January 23, 1990

MEMORANDUM

TO: Roger C. Evans, OCEA

FROM: Don Hibbard, Director, Historic Preservation Program

SUBJECT: Review of Environmental Assessment/Notice of Determination for Lanai Airport improvements Lanai (File No. 90-369)
TMK 4-9-02:1, 41, 46, 47

HISTORIC PRESERVATION PROGRAM CONCERNS:

The EA indicates that in a letter dated October 9, 1989, our office determined that the proposed project will have "no effect" on significant historic sites due to years of intensive pineapple cultivation. However, Bishop Museum was subsequently hired to conduct a "surface assessment" of the project area. Bishop Museum submitted a copy of a letter (December 20, 1989) reporting the results of this assessment. Four artifacts were collected from the surface in two localities. The report states that the presence of these artifacts "suggest the potential existence of subsurface archaeological remains" (p. 2). For this reason, the report presented four recommendations involving additional archaeological work.

Because of this new evidence, it appears that the proposed project may have an effect on potentially significant historic sites. Thus, we now recommend that an archaeological inventory survey, consisting of surface collection of artifacts and limited subsurface testing be conducted within the proposed project area. A copy of the final report should be submitted to our office for review and comments prior to its incorporation in the draft Environmental Impact Statement.

Should you have any questions, please feel free to contact Ms. Annie Griffin at 548-6408.

DON HIBBARD

cc: D. Nakagawa, Airports Division, DOT, State of Hawaii

JOHN WAIHEE
GOVERNOR OF HAWAII

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
Keith W. Ahue
MANABU TAGOMORI
RUSSELL N. FUKUMOTO

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

763

FEB 7 3 09 PM '89

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

REF:OCEA-VIN

FEB 6 1990

File: 90-369
Doc.: 7394E

MEMORANDUM

TO: Honorable Edward Y. Hirata, Director
Department of Transportation

FROM: William W. Paty, Chairperson
Board of Land and Natural Resources

SUBJECT: Environmental Assessment/Notice of Determination for the Lanai Airport Improvements

Thank you for giving our Department the opportunity to comment on this matter. We have reviewed the materials you submitted and have the following comments.

The Environmental Assessment indicates that in a letter dated October 9, 1989, our office determined that the proposed project will have "no effect" on significant historic sites due to years of intensive pineapple cultivation.

However, Bishop Museum was subsequently hired to conduct a "surface assessment" of the project area. Bishop Museum submitted a copy of a letter (dated December 20, 1989) reporting the results of this assessment. Four artifacts were collected from the surface in two localities. The report states that the presence of these artifacts "suggest the potential existence of subsurface archaeological remains" (p.2.). For this reason, the report presented four recommendations involving additional archaeological work.

Because of this new evidence, it appears that the proposed project may have an effect on potentially significant historic sites. Thus, we now recommend that an archaeological inventory survey, consisting of surface collection of artifacts and limited subsurface testing be conducted within the proposed project area.

A copy of the final report should be submitted to our office for review and comments prior to its incorporation in the draft Environmental Impact Statement.

If you have any questions, please feel free to call me or Cathy Tilton at our Office of Conservation and Environmental Affairs at 548-7837.

WILLIAM W. PATY

cc: Historic Preservation Program

PUBLIC HEARING

LANAI AIRPORT MASTER PLAN IMPROVEMENTS

ENVIRONMENTAL IMPACT STATEMENT

CERTIFIED COPY

TRANSCRIPT OF PROCEEDINGS

Taken at the Lanai High and Elementary School Cafeteria, Lanai City, Lanai, Hawaii, commencing at 7:20 p.m., on Tuesday, August 21, 1990, in accordance with the Notice of Public Hearing.

BEFORE: KAYLA R. SCOTT, RPR, CSR NO. T-1130

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CHAIRMAN DENNIS HOKAMA: I think we can begin. It's 7:20, and I hereby declare the public hearing concerning the Lanai Airport Master Plan Environmental Impact Statement now opened.

My name is Dennis Hokama. I am a Commissioner on Transportation, appointed by the Governor under Section Chapter 26-19 H.R.S. and confirmed by the State Senate. I am commissioned by the Director of Transportation to chair this public hearing on his behalf.

The following guests are here tonight, and I would like to introduce State Senator Levin and Mrs. Levin. Thank you for gracing our public hearing.

I would like to call on Mr. Owen Miyamoto, Airports Administrator, to introduce the other staff members of the commission.

MR. MIYAMOTO: Mr. Chairman, tonight from our staff of the Department of Transportation, Airports, Jon Sakamoto, who is at Kahului Airport in Maui, is here tonight. In addition to that, Walter Nishigata, who is our head planner, and his assistant, Dean Nakagawa, is also here tonight with us.

Our consultants will introduce themselves and the rest of their staff consisting of Park Engineering, Inc.

1 And also with us, although they are not part
2 of the Master Plan hearing itself, but deeply involved
3 in the construction program that is going on, KFC
4 Airport, Francois Iragui, the president of the
5 company, is here tonight.
6 CHAIRMAN HOKAMA: The purpose of this hearing
7 is to comply with Section 91-3 Hawaii Revised Statutes
8 and the provisions of the National Environmental
9 Policy Act and the Federal Aviation Administration
10 Order No. 5050.4A, by affording all interested persons
11 an opportunity to submit data, views or arguments,
12 orally or in writing, with respect to the proposed
13 Environmental Impact Statement.
14 When your name is called, please come
15 forward, and we don't have a microphone, but anyone
16 that will provide testimony, we want you to step up at
17 the podium so you will be in a position to be heard by
18 our stenographer. Okay. State your name, address,
19 organization, if any, and interest. Unless you are
20 called to order by me or until your time is up, you
21 may speak freely with respect to the subject matter.
22 And given the number of attendants, I don't
23 think it's necessary to have any time restrictions at
24 this time anyway.
25 In order that the testimonies be kept

1 relevant and material to the issues, we wish that you
2 address yourself to the subject of this hearing.
3 Written submissions will be received until
4 September 15, 1990, at the Engineering Branch,
5 Airports Division, Honolulu International Airport,
6 Honolulu, Hawaii 96819.
7 In order that each and every interested
8 person may be given a fair opportunity to be heard at
9 this public hearing, we request that you observe the
10 following procedures:
11 If you wish to speak and have not done so
12 already, please enter your name on the sign-up sheet
13 together with your address, the organization you
14 represent, if any, and await your turn.
15 The general agenda for tonight will be as
16 follows: First, Mr. Owen Miyamoto of the Department
17 of Transportation will call upon the consultants
18 working on this program for the Airports Division.
19 The consultant will make a short presentation followed
20 by a 15-minute recess, and we may be able to shorten
21 the recess. When we resume, we will then receive your
22 testimony.
23 We are here tonight to solicit factual
24 testimonies from you on this program. This hearing is
25 not intended to be a popular referendum.

1 The proceedings of this hearing will be
2 recorded. It is important that you speak clearly.
3 Testimony should be factual, brief, unemotional, and
4 free of any political references.
5 We will now get into the details of the Lanai
6 Airport Master Plan Environmental Impact Statement. I
7 would like to call on Mr. Miyamoto at this time.
8 MR. MIYAMOTO: Thank you, Mr. Chairman. The
9 purpose of our hearing tonight is to present to the
10 public and to receive testimony from the public on the
11 proposed Master Plan Environmental Impact Statement
12 for the proposed improvements to Lanai Airport.
13 I think it's quite obvious that the aviation
14 demands and needs for the community is changing as the
15 hotels and resort areas begin to develop on this
16 island. We can see that changing already.
17 We've noticed from the traffic changes that
18 there is a certain need for some improvements. Lanai
19 Airport has a need for improvements to its runway, as
20 well as its terminal building, and some of its parking
21 facilities. In other words, basic infrastructure is
22 needed to support the air transportation needs in the
23 community.
24 This is the reason why we're having the
25 hearing tonight so that the community has been part of

1 the planning process that results in the kinds of
2 improvements that the Department is proposing for the
3 community.
4 So at this time I would like to turn the
5 meeting over to Park Engineering staff to make the
6 presentation and describe quickly what has been
7 proposed in previous meetings that we've had here in
8 this community. This will be a formal public hearing
9 on the development that is being proposed.
10 Reginald.
11 MR. SUZUKA: Thank you, Mr. Miyamoto. Park
12 Engineering and Aries Consultants have been working on
13 the Lanai Airport Master Plan for the past few years,
14 and that work is now substantially complete.
15 In a few minutes, John Sanders will talk
16 about the Master Plan, but first let me give you a
17 brief overview of the work that has been put into this
18 project.
19 One of the key elements in the planning of
20 Lanai Airport has been the Technical Advisory
21 Committee. This committee was composed of people from
22 State and County agencies, from the airport users and
23 the local businesses.
24 An integral part of the work on the Master
25 Plan was the noise compatibly program study, which

1 assessed present and future noise impacts on the
2 airport environment. The findings from that study
3 were compiled into a two-volume report, the first of
4 which was completed in August of 1989, and the second
5 in December.
6 All of the work on the Master Plan was
7 documented in a series of working papers and draft
8 reports, and these were presented to the people of
9 Lanai in four informational meetings held here in the
10 school cafeteria.
11 In addition to these meetings, a public
12 hearing was also held on the noise compatibility
13 program.
14 The consultants completed their work on the
15 Master Plan in February of this year. Since that
16 time, during the past several months, the consultants
17 have been working and have prepared the draft of the
18 Environmental Impact Statement, which is the subject
19 of this public hearing.
20 This document discusses the Master Plan and
21 it addresses the impact of the Lanai Airport Master
22 Plan improvements on environmental factors such as
23 land use, economic activities, and existing resources.
24 At this time I would like to call on John
25 Sanders. John.

1 MR. SANDERS: Thank you, Reggie, and good.
2 Evening, ladies and gentlemen. First thing I
3 would like to talk about is some of the basic
4 information that was needed to be developed in order
5 to prepare the Master Plan that is shown on the
6 drawings behind me, and I think you all should have a
7 handout that was put out. If you don't, there are
8 extra copies here. I will pause for a minute.
9 There are three pages on this handout. One
10 shows the aviation forecasts that were prepared for
11 the study. The other one shows the requirements that
12 are based on those forecasts. And the other one shows
13 the capital improvement program costs that go with the
14 Master Plan improvements that I will be talking about
15 in a few minutes.
16 These are three tables that are from the
17 draft Environmental Impact Statement that is being
18 made reference to, and copies are available for review
19 and have been sent to a lot of you for your review and
20 comments.
21 First of all, I will talk about the
22 forecasts. When we prepared these forecasts, as
23 Reggie mentioned, we started a couple of years ago.
24 We were starting basically from a base year of 1985
25 and projected out to the year 2005, a 20-year

1 projection. Since then we have extended our forecasts
2 up to the year 2010 to take advantage of the more
3 recent statewide DBED projections that have been
4 prepared, as well as the projections that relate
5 specifically to Lanai that tie into the residential
6 and business travel and the activity that is occurring
7 now and is likely to occur in the future on the
8 island.
9 As you will see from the first table, we are
10 forecasting a passenger increase from about 57,000 in
11 1987 to 200,000 by the year 2005. It's of interest to
12 note that last year the Lanai terminal handled about
13 105,000 passengers, slightly more than had been
14 forecast in 1990. That's in large part due to the
15 activity that's going on here with the development.
16 We've extended those forecasts, as I
17 mentioned, to a total of 250,000 or a quarter of a
18 million passengers by the year 2010.
19 We have also forecast cargo activity, which
20 is difficult to forecast because not all the activity
21 is reported to the State at the present time. We
22 think there's about 1,000 tons that are handled
23 through the airport at the present time, and we
24 forecast it doubling to 2,000 tons through the 20-year
25 time period.

1 The bottom part of the table relates to
2 aircraft operations. Each time a plane lands or takes
3 off, that's a separate operation. Back in 1987, there
4 were about 16,000. That's forecast to increase to
5 over 21,000 by the year 2005.
6 Air carrier, which includes the Aloha and
7 Hawaiian aircraft, are forecast to increase to almost
8 3,000 operations. Commuter/air taxi, those are the
9 small planes like the Aloha Island Air passenger
10 aircraft, the Air Molokai aircraft, and the small
11 single engine aircraft, and helicopters that you may
12 see here. And those are the commuter/air taxi
13 carriers. The reason that they decline is because, as
14 I will get into in a little while, with more
15 passengers, we expect to see more larger aircraft.
16 And the larger aircraft will seat more passengers and,
17 of course, don't require as many operations.
18 General aviation, which is private flying, we
19 see that almost doubling up to 8,000 operations. And
20 the military, which is a relatively small amount here,
21 is about 300 operations.
22 Going to the third table, we have then
23 translated these forecasts into future requirements.
24 For those of you who haven't been out to the airport
25 recently, the existing conditions of the airport are

1 shown on this drawing here. The airport is contained
2 within approximately 93 acre size and comprises a
3 5,000 foot runway, aircraft parking area here for all
4 the different types of aircraft that come here, the
5 air carrier, the commuter/air taxi, and the general
6 aviation at the present time, and then back here in
7 the red the terminal building, the crash/fire/rescue
8 station, and the cargo and the parking area behind
9 this. This will orient you to the plans that we will
10 talk about in a minute.
11 In terms of future requirements, the first
12 thing we show on this table is the runway length
13 requirement. The 7,000 feet we show for Lanai is
14 comparable to the 6,500 feet that is planned for at
15 the other neighbor island airports, interisland
16 airports. That is the type of aircraft we'll be
17 looking at; that is, the 737s, DC-9 type of aircraft.
18 The length would be slightly more in Lanai because of
19 the somewhat higher elevation.
20 And in terms of the passenger terminal, we
21 show right now the present terminal building is only
22 about 3,000 square feet. Not all the passenger
23 related activity can be conducted inside the present
24 building. It doesn't have enough space. We forecast
25 by the year 2005 that we need about a 22,000 square

1 foot terminal to match the 200,000 passenger
2 projection that I told you about.
3 In terms of aircraft parking positions, we
4 show up to three air carrier parking positions, two
5 commuter aircraft parking positions, and three cargo
6 aircraft parking positions, and those are for the
7 small cargo type aircraft.
8 General aviation, the next category, we do
9 see some more of that activity occurring as I
10 mentioned, both people basing their aircraft at the
11 airport, as well as more visiting, or what we call
12 itinerant general aviation. We show a need for about
13 12 spaces by the year 2005.
14 At the bottom of the table you will see
15 significant increases in the parking spaces. The
16 numbers we list in the existing column show only those
17 designated spaces. They don't include the
18 undesignated spaces in the fields that are used
19 because of the present shortage of space.
20 So these forecast then become the basis for
21 the long-range plans that we've prepared. They're
22 illustrated on these two drawings, which I am sure if
23 you have been to any of our previous meetings, you
24 will have seen these discussed.
25 This first drawing to my immediate left shows

1 the overall airport improvements, and the one to the
2 far left shows this terminal area in a little more
3 detail.
4 First of all, to talk about the overall
5 airport, in order to accommodate the facilities that
6 we're talking about, we need to increase the size of
7 the airport from about 90 acres to almost 500 acres to
8 encompass the improvements I will talk about. And
9 that includes space for not only airfield facilities,
10 the terminal area, but also what we call protection
11 areas, areas off the ends of the runways that should
12 be under the control of the State as the airport
13 sponsor.
14 In terms of the airfield improvements, we're
15 proposing that the runway be extended up to 2,000 feet
16 to the northeast. The parallel taxiway will be the
17 full length of the runway. Currently there is no
18 taxiway. Additional aircraft parking area can be
19 provided in front of the terminal facilities that I
20 will discuss in a minute.
21 At the southwest end of the airport, there is
22 some navigation aid improvements that are being
23 proposed. One is an Instrument Landing System which
24 would allow aircraft to land in more inclement weather
25 so that you would have more reliable service with the

1 installation of such a facility. The ILS glide slope
2 would give vertical guidance and is located here and a
3 localizer at the other end of the runway would give
4 horizontal guidance along the runway.
5 We're also proposing an approach lighting
6 system be installed that would extend two to three
7 thousand feet beyond the end of the runway in this
8 area here.
9 We're also proposing what's known as an AWOS,
10 an Automatic Weather Observing System, that again goes
11 with the Instrument Landing System and the improved
12 capabilities that can be provided here to provide for
13 more reliable service, particularly in inclement
14 weather.
15 So those are some of the significant airfield
16 improvements. As a result of recent FAA guidelines,
17 we have to provide what is known as a runway safety
18 area beyond each end of the runway which will extend
19 to 1,000 feet as sort of an extension beyond the
20 runway, 1,000 feet in length.
21 In the terminal area, this area here, which
22 is shown in more detail over here, we're proposing
23 that a new passenger terminal building be constructed,
24 as I mentioned, which would encompass all the
25 activities that are needed, the ticketing; baggage

1 claim; security, if that's required; rental cars;
2 concession space, whether it be for rental cars, food
3 and beverage, things like that that would be provided
4 in a new building here that could be expanded as the
5 demands warranted.
6 We're also proposing a new cargo area, and
7 again the current facilities are inadequate. As I've
8 indicated, we have a new cargo facility and space for
9 general aviation. General aviation space would
10 consist of the hangars which are the buildings that
11 you may see at Kahului and Honolulu where people park
12 their aircraft in the covered space or out on the
13 apron area over here. And so we would have in this
14 yellow area here sufficient space through the year
15 2005 with space reserved beyond that for air carrier
16 parking, commuter parking, cargo, and general aviation
17 in this area through here.
18 Also, in the terminal area, we're showing a
19 new parking lot again to be developed to match the
20 incremental increase in demand at the airport. And
21 then back here this area would be reserved for we what
22 call airport support lease lots. The ground
23 transportation companies could lease lots for their
24 facilities just as you see at Kahului or other
25 airports in the State.

1 And then we have an area here that we've just
2 reserved for future development. We're not crystal
3 balling that far into the future, and who knows what
4 might happen. And this is space that is adjacent to
5 the airfield again that would be developed if and when
6 it's needed.
7 And that's about as far as we can really go
8 in this southwest direction before we get into some
9 serious earth work considerations.
10 We're also proposing that the access road be
11 widened and landscaped and improved to provide a
12 better access into the terminal area here.
13 So these are some of the key features of the
14 Master Plan that are described not only in the Master
15 Plan Report but also in the Environmental Impact
16 Statement that we've prepared.
17 In looking at all of these improvements,
18 turning to the second page of the hand out, you will
19 see that we have an estimated total cost of about $50
20 million. We have put most of the significant items in
21 the first phase. And those really significant items
22 are things like the land acquisition, the airfield
23 improvements, the new terminal complex, and the
24 infrastructure and more activity that's needed to go
25 with that.

1 You'll see that for the land acquisition
2 Castle & Cooke has indicated that they will donate the
3 land that is needed for the airport improvements so
4 that's shown as a zero amount.
5 Some of these costs are based on very general
6 planning estimates. The State is now carefully
7 refining these numbers to see where there might be
8 possible savings based on more accurate information
9 that has been prepared in the design phase of these
10 projects.
11 So that's a summary of the Master Plan and
12 what is being proposed, and environmental impacts are
13 discussed in the Environmental Impact Statement. And
14 I would like to turn it back for either a break or
15 comments.
16 CHAIRMAN HOKAMA: Why don't we take a break
17 for a couple of minutes. Those of you who would like
18 to closely look at the graphics up here that have been
19 provided, you may do so, and we can get into the
20 actual presentation of testimonies.
21 (Recess was taken.)
22 CHAIRMAN HOKAMA: For those of you that have
23 signed to provide testimony, I'll call your name.
24 When you are called, please come up to the podium
25 again and state your name, the organization if you

1 represent any, and speak clearly, because we have a
2 stenographer that's recording verbatim. Okay.
3 We have -- I have three people listed, and
4 after I've exhausted the list, if there's any more
5 that want to provide formal testimony, you will be
6 allowed to do so.
7 At this time I would like to call on Daren
8 Suzuki from the County of Maui, Planning Department.
9 MR. SUZUKI: Mr. Chairman, I'm Daren Suzuki
10 from the Planning Department, Maui County.
11 We offer the following comments from the
12 Planning Department. In reviewing the draft
13 Environmental Impact Statement for the proposed Lanai
14 Airport Master Plan improvements, the Maui County
15 Planning Department has the following comments:
16 1. A Lanai Community Plan Amendment and
17 Zoning Change will be required from Maui County,
18 preferably prior to acquiring Land Use Commission
19 boundary amendment approval.
20 2. Estimated water usage should be addressed
21 in more detail, since this has been a very sensitive
22 issue on Lanai. Also, the State Commission on Water
23 Resource Management, in adopting projected water usage
24 to the end of 1991, did not include the airport's
25 estimated usage in its projections. The additional

usage resulting from the proposed action may trigger an evaluation for a water management area designation.

3. The hours of operation should be addressed. Night operations for cargo and passenger flights should be discouraged, to the extent practicable.

4. Flight patterns over Lanai should be minimized to the extent practicable.

5. Helicopter flights over Lanai City should be avoided.

Thank you for the opportunity to comment.

CHAIRMAN HOKAMA: Thank you, Mr. Suzuki. I would like to call up Mr. Thomas Mitsunaga.

MR. MITSUNAGA: I guess you must be chairman tonight. Mr. Chairman and members of the State Airports Division, I would like to congratulate the State Airports Division for their Environmental Impact Statement. I think this is something that we didn't expect. I think you could have gotten by with an environmental -- what you call that -- well, anyway, you didn't have to go that far.

But in order to work in the future, you did prepare an impact statement so that when you extend the runway, etc. you're all covered. And this is what I am very pleased. You started from the beginning the

1 right way.

2 And you've held several meetings with the
3 community, and you've incorporated the ideas from the
4 community. So I'm here just to praise the Department,
5 and I'm very happy that you're here again giving us
6 the information, and I think I feel like first-class
7 citizen now. Thank you.

8 CHAIRMAN HOKAMA: Thank you, Mr. Mitsunaga.
9 Ron McOmber.

10 MR. MCOMBER: My name is Ron McOmber. I've
11 lived in Lanai for 19 years. The reason I laughed
12 when Thomas mentioned that, if you've been reading the
13 paper and watching what's going on in Lanai, we're
14 having a hell of a time to get the County to give us
15 an impact statement on a simple little project down at
16 Hulopoe. And that's the reason for the backhanded
17 compliment. And we appreciate the impact statement.

18 It's nice and refreshing to know that
19 somebody's doing their job right, but there are some
20 concerns though.

21 And one of the questions I want to ask is:
22 Is Mr. Murdock still going to build the building
23 himself, the terminal building? And if he is, what
24 does Mr. Murdock expect in exchange for this? Mr.
25 Murdock doesn't do anything without something in

1 exchange for it. Beware of the man with the smiling
2 face. He's not always smiling right.
3 One of our concerns is going to be down there
4 as we're watching what's going on in Hulopoe and the
5 amount of homes and the prices of those homes. We're
6 not looking at big jets being our problem. We're
7 going to be a problem with small corporate jets,
8 because these homes at Hulopoe are going to be million
9 dollar plus. This is going to encourage the big --
10 the little -- the big companies with the little jets,
11 and we're going to be inundated by them.
12 And I'm not sure that you're going to have
13 enough ramp area out there if this happens. We've
14 already seen Mr. Nicklaus' jet in here, and we've seen
15 a few other type of jets like Mr. Murdock's.
16 We hear rumors on Lanai that Mr. Murdock
17 wants his own private hangar. Are there
18 considerations on building hangars to hangar these
19 planes. If not, that may be your pay back Mr. Murdock
20 may want down the road.
21 He said when he first got here that he would
22 never take pineapple out of production. All this
23 hotel stuff would be done without taking any land out
24 of production, and in two years pineapple has gone on
25 its butt. So be careful of that. It will have an

1 impact on Lanai, ladies and gentlemen.
2 We desperately need a larger ramp. There's
3 no doubt about it. I was down -- if you're down there
4 any Friday afternoon or Monday morning, you can
5 understand that. I'm surprised somebody already
6 hasn't had an accident down there. There's no doubt
7 that we need more ramp space, but make sure it's ramp
8 space for the commuter planes and the planes that will
9 be servicing Lanai and not for private entities with
10 the big dollars.
11 Lanai is not the same place it was two or
12 three years ago, and we're fighting for our lives over
13 here, and Lanai needs some of this.
14 Again, water is a concern. I hear stories
15 that the plantation manager told you that you had a
16 ten-inch main that you could use at the airport that
17 would be sufficient for the water usage. Also, you
18 better listen that if one pineapple field is being
19 irrigated off of that ten-inch main, you will have no
20 water pressure, so you better check that water
21 pressure situation a lot closer than I think you have.
22 We do have a 4.3 million gallon per day
23 sustainable yield is what is predicted at the end of
24 all this hoopla that's going on in the island. Water
25 is a concern.

1 If you're going to use a sizable amount of
2 water, then I think the residents of Lanai need to
3 know that and so does the company. It has to be built
4 into your plans.
5 Another thing I'm concerned about and there's
6 one sitting down on the ramp right now is a
7 helicopter. I do not want this island to turn into
8 what's happened on all the other islands that we have
9 to fight Papillon and a few of the others. If it's a
10 convenient place for them to land and do tours, we
11 don't need this on the island. This is a quiet, rural
12 community, and we would like to leave it that way.
13 That 2,000 feet runway that you're going to
14 add is going to put noise over the city, especially on
15 days where there's no trade winds. And those jets
16 that go out of here supposedly quote, unquote, heavily
17 loaded are going to have to take more runway, and
18 that's going to put them over the city, especially on
19 nonwindy, trade wind days. That encompassed with a
20 1200 plus feet altitude they're going to need that
21 uplift factor.
22 Are there going to be hangars? I hope not.
23 All I can say is I appreciate the EIS. We
24 all on Lanai appreciate the EIS. I know the people
25 that are doing the work down there, and they're all

1 conscientious. And just keep Lanai as a community it
2 was three years ago or five years ago in mind, not the
3 new Lanai that Mr. Murdock is proposing.
4 Thank you.
5 CHAIRMAN HOKAMA: Thank you, Mr. McOmber.
6 Are there any others in the audience that would like
7 to provide some formal testimony?
8 MR. HOKAMA: Good evening, my name is Rik
9 Hokama. I'm speaking as a Lanai resident tonight.
10 And first of all, I would like to thank all of you who
11 took the time to be here for this evening's gathering.
12 My comments are pretty short and more
13 specific as to what I consider as a person who grew up
14 and lived here and to be concerned about.
15 Some of the things in the draft EIS that I
16 found amusing is all of us on this island know that
17 there's no mongooses. Of course, in your draft EIS,
18 it states there are mongooses in the area. So I beg
19 to differ with that portion of the draft EIS report.
20 Another area that I find sensitive to me --
21 because I'm a great user of the airport, I travel in
22 and out about two, three round trips a week -- is the
23 ability to park. I used to work for Castle & Cooke.
24 Castle & Cooke is donating land. I don't see why the
25 near future residents of this island need to pay for

1 public parking. I think it's an amenity we've enjoyed
2 before, and I think it's something that is unique and
3 should be continued as best as possible for our future
4 expansion areas.
5 Another area that I would like to concur with
6 Mr. McOmber. Just coming back from Kauai this past
7 week and enjoying the Kauai Lagoon Hotel was
8 helicopter flight patterns. In my four hours on the
9 golf course, I had about a hundred flybys from various
10 helicopter companies. I don't really enjoy that, and
11 I don't think our people need that on this island
12 either.
13 An area that causes me great concern though,
14 and I'm not an airport aviation engineer expert, so I
15 can't really comment whether it would be true or not,
16 but at 7,000 feet and if a pavement strength of
17 350,000 pounds, I have a concern about large aircraft
18 coming to Lanai, whether it be 727s, half-loaded
19 DC-10s. I have a concern that those type of aircraft
20 changes the style of community.
21 I think all of us who are residents and
22 people like you who come here whether it be an
23 inconvenience or not, coming to Lanai via small
24 aircraft is part of the character of what keeps Lanai
25 Lanai. And making this another Lihue Airport or

1 Kahului was never the intent of the community
2 residents working on community plan or the county
3 general plan processing.
4 So I would like to give my comments of being
5 not in favor of having very large aircraft coming to
6 the island. I think we want visitors that come here
7 to come to what we have, and if it's via small
8 aircraft, then that's the way they're going to have to
9 enjoy coming to this island.
10 And I appreciate you listening to my
11 comments. Thank you.
12 CHAIRMAN HOKAMA: Thank you, Rik. Anyone
13 else?
14 As a matter of proceedings, if there are no
15 others that would like to provide testimony, what I
16 would like to do is adjourn the formal part of the
17 hearing and to open up an informal form whereby
18 members of the audience may raise questions. We have
19 Mr. Owen Miyamoto from the Airports Division and the
20 consultants who are working on the Master Plan.
21 So if there are no objections at this
22 particular time, having no others to provide formal
23 testimony, I would like to adjourn the public hearing
24 at 7:55.
25 (The public hearing concluded at 7:55 p.m.)

C E R T I F I C A T I O N

I, Kayla R. Scott, C.S.R., do hereby certify:

That on Tuesday, the 21st of August, 1990, commencing at 7:20 p.m., all the testimony and proceedings in the foregoing-entitled matter were taken by me in machine shorthand and thereafter reduced to typewriting; that the foregoing represents, to the best of my ability, a full, true and correct transcript of the proceedings had in the foregoing matter.

I further certify that I am not attorney for any of the parties hereto, nor in any way interested in the outcome of the cause named in the caption.

DATED: 10-9-90.

Kayla R. Scott

KAYLA R. SCOTT, CSR NO. T-1130

ATTENDANCE SHEET
(Please Print)

Subject LANAI AIRPORT E.I.S. PH.
Place LANAI SCHOOL CAFETERIA
Date AUG. 21, 1990 Time 7:20 ~~a.m.~~/p.m.

Print Legibly

NO.	Name	Organization	Address	Phone #
1	KEITH LYSEN	KFC AIRPORT	PO BOX 604 LANAI CITY	565-7427
2	IRENE LYSEN	"	"	"
	ANDY LEVIN	STATE SENATE	STATE CAPITOL, RM 20 OF HNL	541-6357
	Nicolette Levin		167 Keawe St, Hilo	935-007
	Dawn Suzuki	Planning Dept	County of Maui	243-[illegible]
	Rick Hokama		P.O. Box H Lanai	565-6503
	Eugene Shepherd	DOT AIRPORT DIV	BOX 813	565-6757
	FRANCOIS X. IRAGUI	KFC AIRPORT INC	HONOLULU, HI	836-778[illegible]
	ARTHUR STILLWELL	"	"	"
	THOMAS T. MITSUNAGA	LANAI RESIDENT	P.O. BOX 733, LANAI	565-[illegible]
	Roy K. Kamota	~~[illegible]~~	Lanai	565-6611
	ANNABEL CHOTZEN	LANAI Company	650 Iwilei Rd. Honolulu	548-379[illegible]
	Reginald Suzuka	Park Engineering	567 So. KING ST.	531 167[illegible]
	Dennis Hokama	Commission On Fam.	P.O. Box 56, Lanai City	565-6453

ATTENDANCE SHEET
(Please Print)

Page 2 of 2

Subject LANAI AIRPORT EIS
Place LANAI SCHOOL CAFETERIA
Date AUG. 21, 1990 Time 7:20 a.m./p.m.

Print Legibly

NO.	Name	Organization	Address	Phone #
1	Arthur C Schneider	Papillon Hawaiian Helicopters	385 ONE ST KAHULUI HI	877-0022
2	Sandra Hew	Papillon Hawaiian Helicopter	3664 Lower Honoapiilani	669-0651
3	Don Lanier	Papillon Hawaiian Helicopters		
4	JON SAKAMOTO	DOT-A	KAHULUI AIRPORT	877-0078
5	Joana Varawa	The Lana'i Times	Box 650 - Lana'i 96763	565-6538
6	JOHN SANDERS	ARIES CONSULTANTS		415-553-7150
7	Walter Nishigata	DOT-A		836-6407
8	Owen Miyamoto	DOT-A		
9	Dean Nakagawa	DOT-A		

TESTIMONY SIGN IN
(Please Print)

Subject Lanai Airport MP - EIS P.H.
Place Lanai Elem. School Cafeteria
Date 8/21/90 Time 7:20 ~~a.m.~~/p.m.

Print Legibly

NO.	Name	Organization	Address	Phone #
	Daren Suzuki	Planning Dept	County of Maui	243-7735
	THOMAS T MITSUNAGA	LANAI CITIZEN	P.O. Box 733	565-6768
	RON McOMBER	LANAI RES.	BOX W	565-6071
	Riki Hokama	Lanai ~~City~~ Res.	Lanai City	

SECTION 12

SECTION 12

COMMENTS ON DRAFT EIS

1489

August 2, 1990

Mr. Owen Miyamoto
State of Hawaii
Department of Transportation
Airports Division
Honolulu International Airport
Honolulu, HI 96819

Dear Mr. Miyamoto:

Subject: Draft Environmental Impact Statement (DEIS) for the Lanai Airport Master Plan Improvements (AIR-EP 90.26)

We have reviewed the DEIS and offer the following comments to pages 1-11, 2-11 and 5-5. It states, "MECO plans to upgrade this system to 12,470 volts once it completes the installation of the Miki Basin Power Plant". We will upgrade up to Miki Basin Road; however, after Miki Basin Road, we will step down the 12,470 voltage to maintain the existing voltage serving the airport facility. We have adequate voltage and line capacity to support your new airport facilities.

On page 5-5, subsection 5.5.1, paragraph 2, MECO's existing underground service from Kaumalapau Highway is adequate to serve the new facilities; however, with the road expansion to the airport, these facilities will need to be moved to the shoulder of the new road right of way.

If you have any questions regarding our comments, please call Ed Reinhardt at 871-8461.

Sincerely,

Calvin A. Kuwanoe
Manager, Engineering

SUITE 300 KAWAIAHAO PLAZA
567 SOUTH KING STREET
HONOLULU, HAWAII 96813-3036
TELEPHONE: (808) 531-1676
FAX: (808) 536-5996
ParEn, Inc. dba park engineering
ENGINEERS, SURVEYORS, PLANNERS

LETTER OF TRANSMITTA

(968)

DATE: AUG. 14, 1990
JOB NO.: TC #968
ATTENTION: ED REINHARDT
RE: DEIS FOR LANAI AIRPOR
MECO LETTER OF AUG. 2, '9

TO MAUI ELECTRIC COMPANY
210 WEST KAMEHAMEHA AVE.
WAILUKU, MAUI, HI 96732-0398

GENTLEMEN:

WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Tracings ☐ Specifications
☐ Copy of letter ☐ Change order ☑ AS LISTED

COPIES	DATE	NO.	DESCRIPTION
1	–	3	REVISIONS TO PAGES 1-11, 2-11 AND 5-5

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☑ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS PLEASE LET ME KNOW IF REVISIONS LOOK OKAY. IF NOT, PLEASE EDIT AND RETURN TO ME.

COPY TO ARIES CONSULTANTS W/ ENCL
AIRPORTS DIVISION
ATTEN: DEAN NAKAGAWA
W/ ENCL

SIGNED: Ira Suzuka

August 21, 1990

Mr. Reginald Suzuka
Project Manager
Park Engineering
Kawaiahao Plaza
567 So. King St., Suite 300
Honolulu, HI 96813

Dear Mr. Suzuka:

We have reviewed and revised the attached pages 1-11, 2-11 and 5-5.

If you have any questions, please call me at 871-8461.

Sincerely,

Ed Reinhardt

Ed Reinhardt
Manager, Engineering

er/bk

Encls.

line will be required to meet the fire demand and the increase in domestic water demands at the Airport.

1.7.3.3 Wastewater Treatment and Disposal

Wastewater generated by users of the Airport are disposed of in two cesspools located on either side of the passenger terminal building. Since new State Health regulations will prohibit cesspool disposal, a new treatment facility will be required for the Airport. One of the designs to be investigated will be a system based on soil absorption technology.

1.7.3.4 Storm Drainage

As discussed in the section on Natural Hazards, the siting and topography of the Airport provide for natural drainage to the east (towards Miki Basin and west (to Kalamaiki Gulch). The natural drainage courses, together with airport-developed cross-runway underground culverts and drainage swales developed along the graded shoulder edges, are adequate for the present drainage needs. Most of the storm waters flowing to the Airport area eventually drain into Miki Basin.

1.7.3.5 Power and Communications

Electrical power supply to the Airport is provided by a Maui Electric Company (MECO) buried (7,200 volt) direct cable from Kaumalapau Highway. This line is a part of the main distribution system of MECO. At present the utility company is developing a new power plant at Miki Basin, and upon completion of this plant, the ~~Kaumalapau Highway~~ Kaumalapau service line up to Miki Basin Road will be upgraded to 12,470 volts. Minor upgrading of the airport-specific electric service lines will be necessary as the Master Plan expansion and/or improvement plans are implemented.

The existing 25 Kilowatt emergency power system will likely be inadequate after development of the new facilities within the Master Plan parameters. To ensure necessary emergency power to the Airport, a 75 Kilowatt generator system should be installed.

Telephone service for the Island of Lanai, including the Airport, is provided by the Hawaiian Telephone Company (HTCO) HTCO is in the process of improving and expanding the telephone service capabilities for the Island; due in part to proposed Castle and Cooke's development plans on the Island. Telephone service facilities in the airport area include 25 pairs of aerial wires (24 currently in use) along Kaumalapau Highway and 50 pairs (14 currently in use) of direct-bury service cables serving the Airport. HTCO has proposed to increase the service capacity in the area by adding more service cables during 1990.

1.7.3.6 Lighting Systems

The existing runway has medium intensity runway lights (MIRL) and there are aircraft parking apron lights. The runway extension and existing runway will be equipped with high intensity runway lights (HIRL) in the future. Approach lighting system (MALSR) taxiway lights, aircraft parking apron, vehicular parking lot and roadway lights are recommended in the Master Plan.

Upon completion of the new power plant, the distribution system al
Miki Road will be upgraded to a 12,470 volt system.

Kaumalapau Hwy and up To

Kaumalapau Highway system. The existing 7,200 volt system along the Kaumalapau Highway ~~is~~ has adequate capacity for the future load requirements of the airport and need not be up-graded.

Telephone System. The Hawaiian Telephone Company (HTCO) provides the telephone service for all of Lanai. To meet the demands of Castle and Cooke's planned developments for Lanai, HTCO is increasing and expanding its telephone facilities within Lanai City and in Miki Basin.

Telephone facilities in the immediate vicinity of the Airport consist of 25 pairs of aerial cables located along Kaumalapau Highway. Of these 25 pairs, all but one are currently in use. HTCO plans to increase the line capacity in 1990 by adding additional cables.

The telephone system at the Airport consists of 50 pairs of direct-bury underground cables installed along the access road. At the present time, the Airport uses only 14 of the available 50 pairs.

Emergency Power System. The capacity of the existing emergency power system is 25 KW. This capacity will not be adequate for the recommended Master Plan facilities.

2.2 RECOMMENDED AIRPORT MASTER PLAN

This section presents the recommended Airport Master Plan Improvements for Lanai Airport through the year 2005. The recommended year 2005 Airport Master Plan for Lanai Airport is illustrated on Figure 2-6 and the Terminal Area Plan on Figure 2-7. The Plan integrates long-term airfield and terminal area requirements with forecast aviation demand and Airport access and parking needs. It represents a guide for Airport development through the year 2005 planning period and indicates possible developments beyond the year 2005 for which land should be reserved at this time.

The recommended Airport Master Plan was based on the comments received on the "Alternative Airport Development Concepts." Following review by the State Department of Transportation, Airports Division, the Federal Aviation Administration, the Lanai Airport Technical Advisory Committee, and the public, the recommended concept was further developed into the detailed plans presented in this section. The recommended concept plan was presented and discussed at the Technical Advisory Committee and Public Meetings on the Lanai Airport Master Plan held by the State Department of Transportation, Airports Division in September, 1989.

2.2.1 AIRPORT LAND USE PLAN

The land use takes into account existing and planned uses for the Airport. Lands required for aviation and airport support activities are also identified. The future land use area allocations are based on the projected demands and requirements described earlier in the report.

The Airport Master Plan preserves land for potential airport expansion beyond the 2005 planning period. Land has been set aside for future runway extension, terminal area

A. Impacts

The existing drainage ditches to the northeast of Runway 21 have a drainage area of approximately 700 acres that is tributary to Miki Basin. The construction of the runway extension will obliterate some of these ditches. This will cause storm water from the upper reaches to flow into the lower basin and aggravate the flooding and ponding conditions in the low-lying areas.

B. Mitigation Measures

The existing drainage ditches that are affected by the construction of the new runway extension will be reconstructed.

5.5 POWER AND COMMUNICATIONS

5.5.1 ELECTRICAL SYSTEM

Electrical power for Lanai is provided by the Maui Electric Company (MECO). At the present time, MECO is constructing a new power plant in Miki Basin (see Figure 2-5). A portion of the main distribution system along Miki Road between the power plant and Kaumalapau Highway has already been installed and connected to the existing Kaumalapau Highway system. The existing system along the Kaumalapau Highway is adequ ~~only a 7,200 volt system.~~ MECO plans to upgrade this section of the system to 12,470 volts once it completes the installation of the Miki Basin Power Plant.

Electrical service to the airport is provided via a 7,200 volt direct-buried cable along the Lanai Airport access road. This cable is adequate for the proposed master plan expansion. However, with the construction of the new access road, this cable must be relocated to the shoulder of the new roadway. A 250 lineal feet section of direct-buried cable fronting the parking area is substandard, however, and need to be upgraded. In addition, new electric ductlines will be required to service the new terminal buildings, ground transportation facilities and parking areas.

A. Impacts

The proposed master plan facilities will place additional loads on MECO's power source and transmission system.

The capacity of the existing emergency generator system will not be adequate to meet the increase in demands of the Master Plan facilities.

B. Mitigation Measures

The new power plant in Miki Basin and the improvements planned to the transmission line along Kaumalapau Highway will provide sufficient capacity to meet the demands of the Airport. The capacity of the emergency generator system will be increased to 75 KW.

JOHN WAIHEE
GOVERNOR

EDWARD Y. HIR
DIRECTOR

DEPUTY DIRECTOR
DAN T. KOCHI (PRN
RONALD N. HIRA
JEANNE K. SCHU
CALVIN M. TSUC

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION
HONOLULU INTERNATIONAL AIRPORT • HONOLULU, HAWAII 96819

IN REPLY REFER T

AIR-EP
90.301

December 21, 1990

Mr. Calvin Kawanoe
Manager, Engineering
Maui Electric Company
210 West Kamehameha Avenue
Wailuku, Hawaii 96732-0398

Dear Mr. Kawanoe:

We are currently finalizing the Environmental Impact Statement (EIS) for Lanai Airport. Consequently, this letter is to inform you that we have revised pages 1-11, 2-11 and 5-5 to reflect your comments of August 2, 1990 on the Draft EIS.

Your interest and participation in this project is much appreciated.

Very truly yours,

Owen Miyamoto
Airports Administrator

cc: Park Engineering (R. Suzuka)

DEPARTMENT OF
HUMAN CONCERNS
COUNTY OF MAUI

HANNIBAL TA
ROBERT AGR
MIRIAM K. KAHA
Deputy

200 SOUTH HIGH STREET, WAILUKU, HAWAII 96793

(808) 2

August 16, 1990

Honorable John Waihee, Governor
State of Hawaii
c/o Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Governor Waihee:

Subject: Environmental Impact Statement Prepared for the Lanai Airport Master Plan Improvements.

The Office of Economic Development has reviewed the subject Environmental Impact Statement and find that, in general, it has adequately identified and addressed the major environmental impacts which can be anticipated to result from the proposed project.

However, in the Table of Contents the page numbers 1-7 Terminal and Airport Support Facility, thru 1-16 Permits and Approvals are in error. It should read 1-5 thru 1-14, page 2-11 Airfield Plan and 2-15 Runway 3-21 should read 2-14, page 2-15 Taxiways should read 2-16, page 2-18 Airport Support should read 2-16, page 2-22 Capital Improvements Programs should read 2-20.

We have no other comments to offer at this time; however, we thank you for the opportunity to review the Environmental Impact Statement.

Very truly yours,

FRED MATSUMOTO
Economic Development Coordinator

EDWIN OKUBO
Housing Division
Administrator

ROBIN TANAKA
Senior Services Division
Administrator

MICHAEL LUXTON
Youth Services Division
Coordinator

FRED MATSUMOTO
Economic Development
Division
Coordinator

ARNOLD BASA
Immigrant Services
Division
Coordinator

JAN DAPITAN
Volunteer Action Division
Coordinator

ROY FUSATO
Office on Aging
Executive on Aging

AL TAVARES
Mayor
ALVIN FUKUNAGA
Director

17

AARON SHINMOTO, P.E.
Land Use and Codes Administration
BASSIE MILLER, P.E.
Wastewater Reclamation Division
FRED ARAKI, P.E.
Engineering Division
BRIAN HASHIRO, P.E.
Solid Waste Division
GEORGE KAYA
Highways Division

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
LAND USE AND CODES ADMINISTRATION
250 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

August 20, 1990

State of Hawaii
Department of Transportation
Attn: Mr. Owen Miyamoto
Airports Administrator
869 Punchbowl Street
Honolulu, Hawaii 96813-0597

Gentlemen:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE LANAI AIRPORT MASTER PLAN IMPROVEMENTS (AIR-EP, 90.26)

We have reviewed the above request and offer the following comments:

1. That the existing airport access road does not meet our latest design standards and should be upgraded.

2. That a final detailed drainage and erosion control plan including, but not limited to, hydrologic and hydraulic calculations, and scheme for controlling erosion and disposal of runoff water, and an analysis of the soil loss using the HESL erosion formula, be submitted for our review and approval. The plan shall provide verification that the grading and runoff water generated by the project will not have an adverse effect on the adjacent and downstream properties.

3. That the Lanai Airport master plan be revised to include forecasting to the year 2010 to be consistant with the State Department of Transportation, Highways Division Year 2010 Island Wide Transportation Study.

4. That a separate left-turn lane on Kaumalapau Highway with its intersection with the airport access road be constructed during the first phase of the airport expansion.

5. That no clearing and grubbing material shall be disposed of at the County sanitary landfill. The developer shall submit a solid waste management plan acceptable to the Department of Public Works. For additional information, the developer is requested to contact the Solid Waste Division.

6. That the proposed landfill site stated in the Lanai Airport master plan improvements report dated July 1990 has been rejected by the County of Maui due to possible destruction of endangered plant species. The report should be amended to address this concern.

7. That the existing airport area is not serviced by a County wastewater system. Therefore, appropriate private facilities should be planned.

If you have any questions, please contact the Land Use and Codes Administration at 243-7373.

Very truly yours,

Alvin K. Fukunaga
Director of Public Works

AS:sn

cc: Engineering Division
Wastewater Reclamation Division
Solid Waste Division
Planning Department

HANNIBAL TAVARES
Mayor
ALVIN FUKUNAGA
Director

AARON SHINMOTO, P.E.
Land Use and Codes Administration
EASSIE MILLER, P.E.
Wastewater Reclamation Div.
FRED ARAKI, P.E.
Engineering Division
BRIAN HASHIRO, P.E.
Solid Waste Division
GEORGE KAYA
Highways Division

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
LAND USE AND CODES ADMINISTRATION
250 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

October 1, 1990

State of Hawaii
Governor
c/o OEQC
465 South Kihei St., Suite 104
Honolulu, Hawaii 96813

Gentlemen:

Re: Draft Impact Environmental Impact Statement for the Lanai Airport Master Plan Improvements at Lanai, TMK:4-9-02:1; 4-9-02:41, 4-9-02:46 & 47, MO-2/19/97-1999.

We have reviewed the subject application and offer the following comments:

1. That a detailed drainage and erosion control plan including, but not limited to, hydrologic and hydraulic calculations, scheme for controlling erosion and disposal of runoff water, and an analysis of the soil loss using the HESL erosion formula, be prepared. The plan shall provide verification that the grading and runoff water generated by the project will not have an adverse effect on the adjacent and downstream properties.

2. That traffic studies be prepared and recommendations implemented to address the potential traffic problems that the project will create.

If you have any questions, please contact the Land Use and Codes Administration at 243-7373.

Very truly yours,

ALVIN K. FUKUNAGA
Director of Public Works

AS/mt

cc: Maui County Planning Department
Engineering Division
SOH/DOT/Airports Division
Federal Aviation Administration
~~Park Engineering~~
DOC

JOHN WAIHEE
GOVERNOR

EDWARD Y. HIRATA
DIRECTOR

DEPUTY DIRECTORS
DANT. KOCHI (PRIMARY)
RONALD N. HIRANO
JEANNE K. SCHULTZ
CALVIN M. TSUDA

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION
HONOLULU INTERNATIONAL AIRPORT • HONOLULU, HAWAII 96819

IN REPLY REFER TO
AIR-EP
90.304

December 24, 1990

Mr. Alvin Fukunaga, Director
Department of Public Works
County of Maui
220 High Street
Wailuku, Hawaii 96793

Dear Mr. Fukunaga:

We are currently preparing the Final Environmental Impact Statement for the Lanai Airport Master Plan. Consequently, we have reviewed your comments of August 20, 1990 and October 1, 1990 and provide the following responses:

August 20, 1990 Comments

1. Comment 1 - The airport access road will remain under State jurisdiction and as such will be designed to State standards.

2. Comment 2 - Under the design work, we will prepare a drainage and erosion control plan depicting the scheme(s) for controlling erosion and disposal of storm runoff. This will be done in accordance with Chapter 20.08 of the Maui County Code and will be submitted to you together with the hydrologic/hydraulic calculations and soil loss analysis during the design phase.

3. Comment 3 - The aviation demand forecasts have recently been revised and updated to the year 2010 as part of our Statewide Airport System Plan.

4. Comment 4 - As noted in Chapter 7 of the Lanai Airport Master Plan, all of the improvements for Kaumalapau Highway and the airport access road, including the left turn storage lane, will be constructed in the first phase.

5. Comment 5 - The State will make other arrangements for the disposal of clearing and grubbing material and will consult with your Department on a solid waste management plan.

AIR-EP
90.304

6. Comment 6 - The EIS has been revised to reflect the change in location for the proposed landfill site.

7. Comment 7 - Since we will not be able to treat our sewage at the County's Lanai City treatment plant, we are planning to construct a separate facility at the airport. The EIS has been revised to reflect this.

October 1, 1990 Comments

1. Comment 1 - Same response as item 2 above.

2. Comment 2 - A detailed traffic study will be prepared under the design contract for the Kaumalapau Highway improvement and access road project. The EIS has been revised to reflect this.

Thank you for your interest and input on this matter.

Very truly yours,

Owen Miyamoto
Airports Administrator

cc: Park Engineering (R. Suzuka)

University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

September 11, 1990
RE:0560

Governor, State of Hawaii
c/o Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Governor:

Draft Environmental Impact Statement
Lanai Airport Master Plan Improvements
Kalulu, Lanai

The above referenced document proposes improvements to the existing Lanai Airport including runway extension from 5,000 feet to 7,000 feet, terminal area expansion, a new parking lot, access and service roads, road widening, and other improvements designed to accommodate forecast aviation demands and allow unrestricted inter-island and general aviation aircraft operations.

The Environmental Center has reviewed this document with the assistance of George D. Curtis, Joint Institute for Marine and Atmospheric Research; Nicholas Palumbo, Comparative Medicine; and William Grannis, Environmental Center.

Project Rationale

On page 2-26, the Draft EIS states the following rationale for the proposed airport improvements: "[t]he present airfield facilities restrict the aircraft take-off and landing weights for both interisland air carrier jet aircraft and general aviation business jets because of the inadequate runway length and pavement strength." It is our understanding that both major interisland carriers currently utilize turbojet equipment (specifically, the 50 passenger DHC-7 and the smaller DHC-6) which requires 3000 feet or less for unrestricted operations. Furthermore, when demand has warranted, larger jet aircraft (B-737 and DC-9) have been permitted to conduct payload restricted operations using the existing facilities. Thus, the commercial carriers are more likely to be limited in their operations by lack of ramp area, terminal facilities, and a parallel taxiway than by runway length or pavement strength.

Forecast Demand

Section 4.1 projects a resident population of 4,500 by the year, 2020, with a total of 650 hotel units and a visitor level of about 50,000 annually (p. 4-5). Assuming 2 operations (enplaning and deplaning) per visitor, 100,000 or half of the projected operations for the year 2005 (Table 1-1) are allocable to the visitor trade. Thus, the remaining 100,000 operations must reflect anticipated travel demand by residents. At this rate, each resident is projected to make roughly 11 interisland trips per year. Our reviewers suggest that such a forecast may not be realistic.

Our reviewers also have noted that the island of Molokai, with a current resident population of 6,900 and 326 existing hotel units, is supported at present by a runway of 4,500 feet in length.

Navigational Improvements

The current VORTAC navigational information system at the Lanai Airport allows for aircraft approach down to 275 feet above ground, with 1-mile visibility. The proposed ILS only increases the approach down to 200 feet above ground with one-half mile of visibility. The climatic conditions characteristic of the Lanai Airport are such that when visibility is restricted by clouds and/or fog, the proposed ILS system would not increase operational margins substantially.

Summary

Our reviewers suggest that the use of State and Federal monies for the proposed extension of the runway is inappropriate if the major benefits of such expenditures accrue to corporate or general aviation jet aircraft. We recommend instead that improvements to the airport be limited to those necessary to accommodate the realistic needs of air carriers and their clientele.

Thank you for the opportunity to review this Draft EIS, and we look forward to your responses to our comments.

Yours truly,

John T. Harrison, Ph.D.
Environmental Coordinator

cc: FAA
Department of Transportation, Airports Division
ParEn, Inc dba Park Engineering
Roger Fujioka
Nick Palumbo
George Curtis
William Grannis

JOHN WAIHEE
GOVERNOR

EDWARD Y. HIRATA
DIRECTOR

DEPUTY DIRECTORS
DAN T. KOCHI (PRIMARY)
RONALD N. HIRANO
JEANNE K. SCHULTZ
CALVIN M. TSUDA

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION
HONOLULU INTERNATIONAL AIRPORT • HONOLULU, HAWAII 96819

IN REPLY REFER TO
AIR-EP
90.300

December 24, 1990

Dr. John T. Harrison, Ph.D.
Environmental Coordinator
University of Hawaii at Manoa
Environmental Center
Crawford 317, 2550 Campus Road
Honolulu, Hawaii 96822

Subject: Draft Environmental Impact Statement for Lanai Airport Master Plan Improvements

Dear Dr. Harrison:

Thank you for your comments of September 11, 1990 on your review of the Draft Environmental Impact Statement. Our responses to your comments are as follows:

Project Rationale

The Lanai Airport is currently served by DHC-7 (Hawaiian Airlines) and DHC-6 (Aloha Island Air) aircraft. These are not turbojet aircraft but propeller aircraft that can operate on the existing 5,000-foot runway without weight restrictions. These aircraft are no longer in production.

The Airport is also used by Aloha Airlines for B-737 turbojet charter operations and has been used by Hawaiian Airlines for scheduled DC-9 turbojet flights in the past. It is expected that these aircraft will serve the Airport in the future on a regularly scheduled basis. These aircraft now operate with weight restrictions at the Lanai Airport because of the inadequate runway length and pavement strength. Therefore, to accommodate the forecast demand and allow unrestricted interisland air carrier aircraft operations it would be necessary to extend and strengthen the runway.

General aviation business operations are also restricted because of the present runway length.

AIR-EP
90.300

Summary

The major benefits of the proposed airport improvements, including the runway extension, are intended to provide for more efficient, reliable and cost effective air transportation to and from Lanai for the movement of passengers, cargo and mail.

Your interest and participation in this project is greatly appreciated.

Very truly yours,

Owen Miyamoto
Airports Administrator

cc: Park Engineering

HANNIBAL TAVARES
Mayor

CHRISTOPHER L. F
Planning Directo
RALPH N. MASUI
Deputy Planning Dir

COUNTY OF MAUI
PLANNING DEPARTMENT
200 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793

August 15, 1990

Mr. Owen Miyamoto, Airports Administrator
State of Hawaii, Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Miyamoto:

RE: Draft Environmental Impact Statement for the Lanai Airport Master Plan Improvements.

In reviewing the draft Environmental Impact Statement for the proposed Lanai Airport Master Plan improvements, the Maui County Planning Department has the following comments:

1. A Lanai Community Plan Amendment and Zoning Change will be required from Maui County, preferably prior to acquiring Land Use Commission boundary amendment approval.

2. Estimated water usage should be addressed in more detail, since this has been a very sensitive issue on Lanai. Also the State Commission on Water Resource Management, in adopting projected water usage to the end of 1991, did not include the airport's estimated usage in its projections. The additional usage resulting from the proposed action may trigger an evaluation for a water management area designation.

3. The hours of operation should be addressed. Night operations for cargo and passenger flights should be discouraged, to the extent practicable.

4. Flight patterns over Lanai should be minimized to the extent practicable.

5. Helicopter flights over Lanai City should be avoided.

Thank you for the opportunity to comment on this subject draft Environmental Impact Statement. If you may have any questions, please contact Mr. Philip Ohta of my staff.

Very truly yours,

for CHRISTOPHER L. HART
Planning Director

PO/ec

cc: P. Ohta
D. Suzuki

JOHN WAIHEE
GOVERNOR

EDWARD Y. HIRATA
DIRECTOR

DEPUTY DIRECTORS
DAN T. KOCHI (PRIMARY)
RONALD N. HIRANO
JEANNE K. SCHULTZ
CALVIN M. TSUDA

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION
HONOLULU INTERNATIONAL AIRPORT • HONOLULU, HAWAII 96819

IN REPLY REFER TO
AIR-EP
90.305

December 24, 1990

Mr. Christopher Hart, Director
Planning Department
County of Maui
220 High Street
Wailuku, Hawaii 96793

Dear Mr. Hart:

We are currently preparing the Final Environmental Impact Statement for the Lanai Airport Master Plan. Consequently, we provide the following responses to your comments of August 15, 1990.

We have begun to compile the materials for the Lanai Community Plan Amendment and Zoning Change applications and we will submit them to you for processing upon completion.

Also, we have engaged a consultant to design the water system infra-structure for the airport. The scope of work will include a more detailed assessment and estimate of the water usage and flow requirements. Additionally, we have notified Mr. James Pierce, President of Lanai Company, Inc. of your concern.

It is anticipated that passenger flights will continue to occur during the same hours as at present i.e., about 6:00 a.m. to 7:00 p.m., and not late at night. However, depending upon demand, there could continue to be some infrequent night air cargo flights.

Currently, arriving and departing aircraft are advised to avoid overflights of Lanai City. Furthermore, as part of our Federal Aviation Regulation (FAR) Part 150 Noise Compatibility Program developed for Lanai Airport, we have recommended and will pursue the adoption of an informal preferential runway use program to be

published in the Pacific Chart Supplement. This program will include a map delineating the location of noise sensitive areas to be avoided and preferred traffic patterns and/or procedures for fixed wing aircraft and helicopter operations into and out of Lanai Airport.

Thank you for your interest and input on this matter.

Very truly yours,

for Owen Miyamoto
Airports Administrator

cc: Park Engineering (R. Suzuka)

JOHN WAIHEE
GOVERNOR OF HAWAII

JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801

October 24, 1990

In reply, please refer to:
EPHSD

2-194

To: Acting, Director
Office of Environmental Quality Control

From: Director of Health

Subject: Lanai Airport Master Plan Improvements, Lanai, Hawaii
Draft Environmental Impact Statement

We have reviewed the Draft Environmental Impact Statement and have the following comments:

1. The project is located below the Underground Injection Control (UIC) line.

2. If the discharge to any cesspool or seepage pit exceeds 1000 gpd per building, a UIC permit will be required for the operation of those disposal units (injection wells).

3. No drywells are proposed for the disposal of rainfall runoff water. If drywells are considered at a later time, a UIC permit will be required for the operation of the drywells.

JOHN C. LEWIN, M.D.

cc: DOT, Airports Division
FAA, Honolulu District Office
✓ParEn, Inc. dba Park Engineering

JOHN WAIHEE
GOVERNOR

EDWARD Y. HIRATA
DIRECTOR

DEPUTY DIRECTORS
DAN T. KOCHI (PRIMARY)
RONALD N. HIRANO
JEANNE K. SCHULTZ
CALVIN M. TSUDA

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO
AIR-EP
90.238

NOV 23 1990

TO: Dr. John C. Lewin, Director
Department of Health

FROM: Edward Y. Hirata
Director of Transportation

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
FOR LANAI AIRPORT

We've received a copy of your memorandum of October 24, 1990 providing review comments on the subject DEIS.

At this time, no decision has been made as to the type of effluent disposal system that will be developed for Lanai Airport. However, we will contact and coordinate all necessary UIC permits and approvals required of us from your office.

c: FAA, ADO
Park Engineering - Mr. Reggie Suzuka

bc: AIR-EDA - Mr. Gene Fong

JOHN WAIHEE
GOVERNOR

EDWARD Y. HIRATA
DIRECTOR

DEPUTY DIRECTORS
DAN T. KOCHI (PRIMARY)
RONALD N. HIRANO
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION
HONOLULU INTERNATIONAL AIRPORT • HONOLULU, HAWAII 96819

IN REPLY REFER TO:
AIR-EP
90.275

December 20, 1990

Mr. Rik Hokama
P. O. Box H
Lanai City, Lanai Hawaii 96763

Dear Mr. Hokama:

Subject: Public Hearing testimony on
Environmental Impact Statement for Lanai Airport

Thank you for your testimony at the public hearing on August 21, 1990.

Our consultant has deleted all references to the presence of mongoose on the Island of Lanai in the Fauna Survey Report.

Your interest and participation in this project is greatly appreciated.

Very truly yours,

Owen Miyamoto
Airports Administrator

c: Park Engineering - R. Suzuka

APPENDIX A

APPENDIX A

TECHNICAL ADVISORY COMMITTEE MEMBERS
Lanai Airport

Mr. Robert Oda, Vice President
Lanai Land Company
Lanai City, HI 96763
244-4081

Mr. Ed Oyama
Superintendent, Engineering
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Ms. Monica Borges, Administrator
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Captain Jules Dudoit
Maui Fire Department
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565-6525

Lt. Barry Born
Maui Police Department
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565-6525

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The Honorable Goro Hokama
Council Member, County of Maui
Lanai City, HI 96763
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Ed Malunay, Manager
Aloha Island Air
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Mr. Mike Davis
Governor's Liaison Office
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TECHNICAL ADVISORY COMMITTEE MEMBERS
Lanai Airport

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Executive Director
Honolulu Airline Committee
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Airport Administrator
Department of Transportation
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Mr. Jon Sakamoto
Airport District Manager
Airports Division
Department of Transportation
Kahului Airport
Kahului, HI 96732

Mr. David J. Welhouse
Airports District Office
Federal Aviation Administration
Department of Transportation
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Tower Chief
Kahului Control Tower
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dba: Oshiro Service & U-Drive
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Lanai City, HI 96763

Office of State Planning
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Ms. Juli Higa
Planner
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200 South High Street
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Mr. Fred Matsumoto
Coordinator
Office of Economic Development
200 South High Street
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Mr. Brian Hashiro
Deputy Director
Department of Public Works
200 South High Street
Wailuku, Maui HI 96793

Mr. Ed Reinhardt
Engineer
Maui Electric Company
210 W. Kamehameha Avenue
Kahului, Maui HI 96793
871-8461

APPENDIX B

FAUNA SURVEY

LANA'I AIRPORT EXPANSION

Island of Lana'i, Hawai'i

by

W. Arthur Whistler

PREPARED FOR:

Park Engineering

PREPARED BY:

CHAR & ASSOCIATES

Botanical/Environmental Consultants
Honolulu, Hawai'i

DECEMBER 1989

APPENDIX B

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SECTION 1

INTRODUCTION

1. 1 Overview

A survey of the terrestrial vertebrate fauna on the areas proposed for expansion of the Lana'i Airport was conducted on 10 November 1989. Nine species of birds were observed at the site, and another was reported to occur there by knowledgeable informants. Another ten species, reported in adjacent areas of Lana'i, although not seen during the field survey, may occur at the site in small numbers, at a different season, or at night. No mammals were seen, but gnawed pineapples indicate that at least one rat species is found there. No reptiles were seen during the survey. None of the animal species recorded at the site is considered threatened or endangered by the Federal and/or State Government.

1. 2 Survey Methods

The field survey was conducted on 10 November 1989 between the hours of 0645 and 1430. The birds were detected by visual observations of them and by their vocalizations. No nests were observed at the site, which is not unusual since the area, which is almost totally devoid of trees, is marginal for nesting activities. However, some of the House Finches and House Sparrows probably nest around the buildings and trees of the airport terminal. The presence of mammals was detected by their droppings and by signs of their feeding activities. No reptiles were seen at the site.

SECTION 2

SURVEY RESULTS

2. 1. Faunal Habitats

The areas proposed for the expansion of the airport are only marginal wildlife habitat. A large part of the site is covered with pineapple, and the remaining area is abandoned pineapple field. Very recently abandoned fields have only sparse vegetation, while fields abandoned for a longer period of time have a dense cover of grasses and other weedy species. A detailed account of the vegetation, including a plant species checklist, is found in the botanical survey of this report.

The landscaped area around the terminal, and the terminal buildings themselves, afford a somewhat different, although small, habitat. It serves to attract some of the urban bird species such as House Sparrows and House Finches which would otherwise find little of interest in the area.

2. 2 Birds

The common and scientific names of the following bird species are in accordance with those listed in Hawaii's Birds (Shallenberger, 1984).

A. Bird Species Observed at the Site

1. Pacific Golden-Plover (*Pluvialis fulva*). Migratory.

This bird, also called the American Golden Plover, is known as the Kolea in Hawai'i. It is a migratory species which nests in the Arctic during summer, but returns to spend the winter in

Hawai'i. At the airport site, they were seen singly in open areas, such as runway margins, lawns, and recently abandoned pineapple fields. They characteristically feed on insects during stops between short runs.

2. Common Myna (Acridotheres tristis). Foreign.

Myna birds are common throughout the islands, generally in urban and lowland areas. At the site they were seen singly or in small groups in recently abandoned pineapple fields, along roadsides, and sitting in trees at the west end of the site. They were also frequently seen (and heard) flying across the site, and probably nest somewhere in Lana'i City.

3. Zebra Dove (Geopelia striata). Foreign.

Also known as Barred Doves, these birds are common throughout the islands, particularly in metropolitan areas. At the site they were commonly seen in small groups feeding on the ground around the airport, in grassland areas, and along dirt roads.

4. Spotted Dove (Streptopelia chinensis). Foreign.

These doves, somewhat larger than the preceding species, are also known as the Lace-Necked Doves or Chinese Doves, and are common throughout the islands. At the site, they were seen singly or in small groups feeding on the ground in grassland areas, recently abandoned pineapple fields, and along dirt roads.

5. House Sparrow (Passer domesticus). Foreign.

These birds, also known as English sparrows, are common in

lowland urban areas throughout the islands. At the site they are common around the structures at the airport where they probably nest, and were also seen in grasslands feeding on weed seeds.

6. House Finch (Carpodacus mexicanus). Foreign.
Also known as Linnets or locally as Papayabirds, House Finches are common in urban areas and forests throughout the islands. At the site, they were seen around structures at the airport, and singly or in small flocks feeding in the tall grasses and weeds of grasslands.

7. Nutmeg Mannikin (Lonchura punctulata). Foreign.
These birds, also known as Ricebirds or Spotted Munias, are found at all elevations throughout the islands. At the site they were seen in small flocks in grassy fields where they feed on the seeds of grasses and other weeds.

8. Northern Cardinal (Cardinalis cardinalis). Foreign.
These birds, also known as Kentucky Cardinals, are common throughout the lowlands of all the main islands. At the site, they were seen singly in the grasslands and in the trees at the west end of the airport. They are much more characteristic of kiawe forests of Lana'i and the other islands.

9. Gray Francolin (Francolinus pondicerianus). Foreign.
These game birds are found on all the main islands except O'ahu. At the site they were commonly seen singly or in small groups in the grasslands, along roadsides, and in the

recently abandoned pineapple fields. They are noted in Hawaii's Birds (1984) to be particularly common on Lana'i.

10. Ring-necked Pheasant (*Phasianus colchicus*). Foreign.
These game birds inhabit open grasslands on all the main islands. Although none were observed at the site during the field study, personnel at the airport fire station noted that at other seasons they were commonly seen around the airport.

B. Other Bird Species likely to be found at the Site

1. Ruddy Turnstone (*Arenaria interpres*). Migratory.
Turnstones, which are more typically found on mudflats and beaches, were seen feeding in recently plowed pineapple fields several miles to the east of the airport site.

2. Warbling Silverbill (*Lonchura malabarica*). Foreign.
These birds, first reported from Lana'i in 1979, are more typical of kiawe forest, but may occasionally visit the site.

3. Northern Mockingbird (*Mimus polyglottos*). Foreign.
Mockingbirds are reported from all the main islands, including Lana'i, and, although they may visit the site, are more typical of dry lowland forests.

4. Red-crested Cardinal (*Paroaria coronata*). Foreign.
These birds are reported to be common on O'ahu, but scarce on the other main islands. They reportedly inhabit brushland and open dry forest, but may also occasionally visit the airport site.

5. Pueo or Short-eared Owl (Asio flammeus sandwichensis). Endemic.

This endemic subspecies of owl hunts by day (diurnal) and by night (nocurnal), preferring open grassy areas. The Pueo is a ground-nesting species.

6. Common Barn-Owl (Tyto alba). Foreign.

This owl is a nocturnal feeder that would only be expected to visit the site at night to feed on rodents.

7. Eurasian Skylark (Alauda arvensis). Foreign.

This skylark, which occurs in open grasslands on all the main islands, is more typical of higher elevations (such as on Maui and the Big Island), but may also visit the site.

8. Chukar (Alectoris chukar). Foreign.

This game bird is reported from all the main islands, and is noted as particularly common on Lana'i, Maui, and the Big Island. It typically inhabits open, arid, rocky areas rather than grasslands, but may be expected to occasionally visit the airport site.

9. California Quail (Callipepla californica). Foreign.

This game bird is reported from all the main islands of Hawai'i. It usually inhabits kiawe thickets, but may be expected to occasionally be seen at the site.

10. Erckel's Francolin (Francolinus erckelii). Foreign.

This game bird is reported from several of the islands including Lana'i, and although not seen during the field

survey, it may be expected to inhabit the grassland areas at the airport site.

2. 3 Mammals

The common and scientific names of the following mammal species are in accordance with those listed in A Field Guide to the Mammals in Hawaii (Van Riper and van Riper, 1982).

1. Rats (Rattus spp.). Foreign.

   No rats were seen at the site, but one was heard rustling under pineapple plants in a field, and a number of fruits there showed signs of rat damage. It was most likely the Roof Rat (Rattus rattus) or the Pacific Rat (Rattus exulans).

2. House Mouse (Mus musculus). Foreign.

   Although no mice were seen at the site, they are likely to inhabit the grasslands and pineapple fields, as well as the structures around the terminal.

2. 4 Threatened or Endangered Species

No threatened or endangered species were observed on the study site during the course of the survey. Although some native Hawaiian marine birds are reported from Lana'i and the seas around it, none would be expected to visit the site. Only two species of water birds, the Pacific Golden-Plover and the Ruddy Turnstone, were noted from the area (the former from the site, the latter from similar habitat a few miles away); neither are threatened or endangered, or would be expected to be affected my the airport expansion.

Only nine species or subspecies of endemic birds are reported from Lana'i. Five of these are extinct on Lana'i; these are the Hawaiian Thrush (Phaeornis obscurus lanaiensis), O'u (Psittirostra psittacea), Lana'i 'Akialoa (Hemignathus obscurus lanaiensis), Lana'i Creeper (Paroreomyza montana montana), and 'I'iwi (Vestiaria coccinea). Two other forest birds, the Maui 'Amakihi (Hemignathus virens wilsoni) and 'Apapane (Himatione sanguinea) are scarce in the forest, but would not be expected to ever visit the airport site. One of the nine is a sea bird, the Dark-Rumped Petrel (Pterodroma phaeopygia sandwichensis), and it would likewise not be expected to visit the site. The last of the nine endemic birds, the Short-eared Owl or Pueo (Asio flammeus sandwichensis), may visit the site to feed, but would not be expected to nest there due to the frequent cultivation practices and human acitivity.

SECTION 3

DISCUSSION AND RECOMMENDATIONS

3.1 Summary of Findings

The area proposed for expansion of the Lana'i Airport consists of previously and currently cultivated pineapple fields, with few native plant species present. Only a few trees, all of them exotic species, are found on the site; this greatly restricts nesting activities by most of the bird species there. In this severely disturbed, non-native habitat, almost all the species observed were foreign. Ten bird species were recorded, but the only one native is the Pacific Golden-Plover which is a

migratory species that nests in the Arctic. Signs of a mammal species, a rat, were noted, but it, as well as the House Mouse, which is probably present, are also foreign species.

3. 2 RECOMMENDATIONS

The proposed project is not expected to have any significant impact on the biological communities of the study site, due to the present severe disturbance to the vegetation, and the consequent almost complete absence of native vertebrates. The site as it is today does not offer any suitable habitat for most native species, nor will it after the proposed modifications are completed.

LITERATURE CITED

Shallenberger, R. J. (ed.). 1984. Hawaii's Birds. Hawaii Audubon Society, Honolulu.

Van Riper, S. G. and C. van Riper III. 1982. A Field Guide to the Mammals in Hawaii. Oriental Publishing Co., Honolulu.

APPENDIX C

JOHN WAIHEE
GOVERNOR, STATE OF HAWAII

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
LEBERT H. LANDGRAF
MANABU TAGOMORI
RUSSELL N. FUKUMOTO

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

REF:HP-AL

OCT 9 1989

Mr. Reginald Suzuka, Project Manager
ParEn, Inc. dba Park engineering
Suite 300, Kawaiahao Plaza
567 South King Street
Honolulu, Hawaii 96813-3036

Dear Mr. Suzuka:

SUBJECT: **Compliance with Chapter 6E -- Lanai Airport Improvements Master Plan**
Island of Lanai
TMK 4-9-02:41

Thank you for consulting our office regarding this proposed project.

There are no known historic sites in the project area. Also, because this area has been under pineapple cultivation, we believe that it is highly unlikely that significant historic sites still exist. Thus, we believe that the proposed project will have a "no effect" on significant historic sites.

Very truly yours,

WILLIAM W. PATY
Chairperson and State
Historic Preservation Officer

cc. Walter Nishigata, Airports Division
Department of Transportation

APPENDIX D

B I S H O P M U S E U M

1525 BERNICE STREET • P.O. BOX 19000-A • HONOLULU, HAWAII • 96817-0916 • (808) 847-3511 • FAX (808) 841-8968

December 20, 1989

Mr. Reginald Suzuka, Project Manager
Park Engineering
Suite 300, Kawaiahao Plaza
567 South King Street
Honolulu, Hawaii 96813-3036

Dear Mr. Suzuka:

Subject: Lanai Airport Surface Assessment Report

The on-site assessment was conducted on Wednesday, 6 December 1989 by Paul Cleghorn and Aki Sinoto from the Applied Research Group of the Bishop Museum. The survey entailed walking the pineapple roads and fallow fields surrounding the existing airport and including the expansion areas in the proposed Airport Master Plan. In addition, some pre-field and post-field literature and documents searches were conducted using the references available in the Museum Library, Geography, Photo Archives, and the Department of Anthropology Collections.

The project area is located in the ahupua'a of Kalulu at an elevation of about 1300 feet. The land surrounding the existing airport is classified agricultural and given the D1 rating by the Land Study Bureau. The soil, consisting of Molokai and Uwala series silty clay loam, is characterized as fine in texture, non-stony, and well-drained. The area receives an annual rainfall of about 20 inches. Present land use is pineapple cultivation which has been continuous since 1922 after short-lived attempts at sugar cultivation around the turn of the century and ranching around 1917. Other than various grasses and plants used for landscaping the airport and roadways, flora other than the cultivated pineapple is notably lacking. The whole area has been extensively altered for agriculture and lacks any natural features such as prominentt hills or drainages.

No previous archaeological studies have been conducted in or near the project area. The two of the most comprehensive references available for the archaeology of Lāna'i (Emory, 1924 and Statewide Inventory 1972) do not document any sites in the area. Historic topographical and land boundary maps also indicate no ruins or sites in the area.

Due to disturbance by pineapple cultivation and the lack of previously documented archaeological remains, the State Department of Land and Natural Resources issued a finding of "no effect" on significant historic sites (Paty letter, Oct. 9, 1989).

Two localities with surface artifacts were discovered during the recent field assessment (see Figs. 1 & 2). Both areas are located beyond the boundaries of the existing airport, but appear to be within the limits of grading in the proposed expansion area.

The area designated Locality One is approximately 1000 feet northeast of the mauka terminus of the existing runway near a pine road junction in an area of fallow fields. A fragment of a pointed and faceted object, possibly an abrader, made from volcanic rock was found on the surface, at the edge of a drainage or irrigation ditch that runs along a pine road.

Locality Two is southwest of the existing terminal area on a slight rise beyond the northwest boundary of the existing airport. Two basalt flakes and a small rectangular adze blank were found southwest of the existing terminal area on a slight rise beyond the northwest boundary of the existing airport. The dispersed surface scatter is primarily composed of basalt fragments although some midden and historics were observed. The area is near the site of a former terminal facility and appears to have been extensively disturbed previously.

The presence of artifacts in the area suggest the potential existence of subsurface archaeological remains. Thus the following recommendations are presented:

1) Intensive survey (Phase I) to include further surface collection and test excavations, both backhoe and controlled manual excavations, in the proposed impact (excavation and grading) areas, including Localities 1 and 2, to permit significance evaluations of potential archaeological remains;

2) Contingent on the results of 1), intensive data recovery (Phase II) may be necessary to mitigate any adverse impacts to remains that are determined to be significant;

3) If intensive data recovery is required, prior to implementation, a cultural resources management plan incorporating a data recovery plan, will be prepared and submitted to DLNR for concurrence; and

4) Archaeological monitoring may be recommended based on the results of 1) and/or 2) above.

Further studies in the area are important since the results will: 1) provide an opportunity to retrieve archaeological data that have been markedly lacking from these mid-elevation zones occuppied by pineapple; 2) contribute new data towards understanding the distribution and relationship of occupation areas in leeward Lā na'i; and 3) contribute to the understanding of the prehistory of Lāna'i and the archipelago.

We will be forwarding you a proposal for Phase I Survey under separate cover in early January.

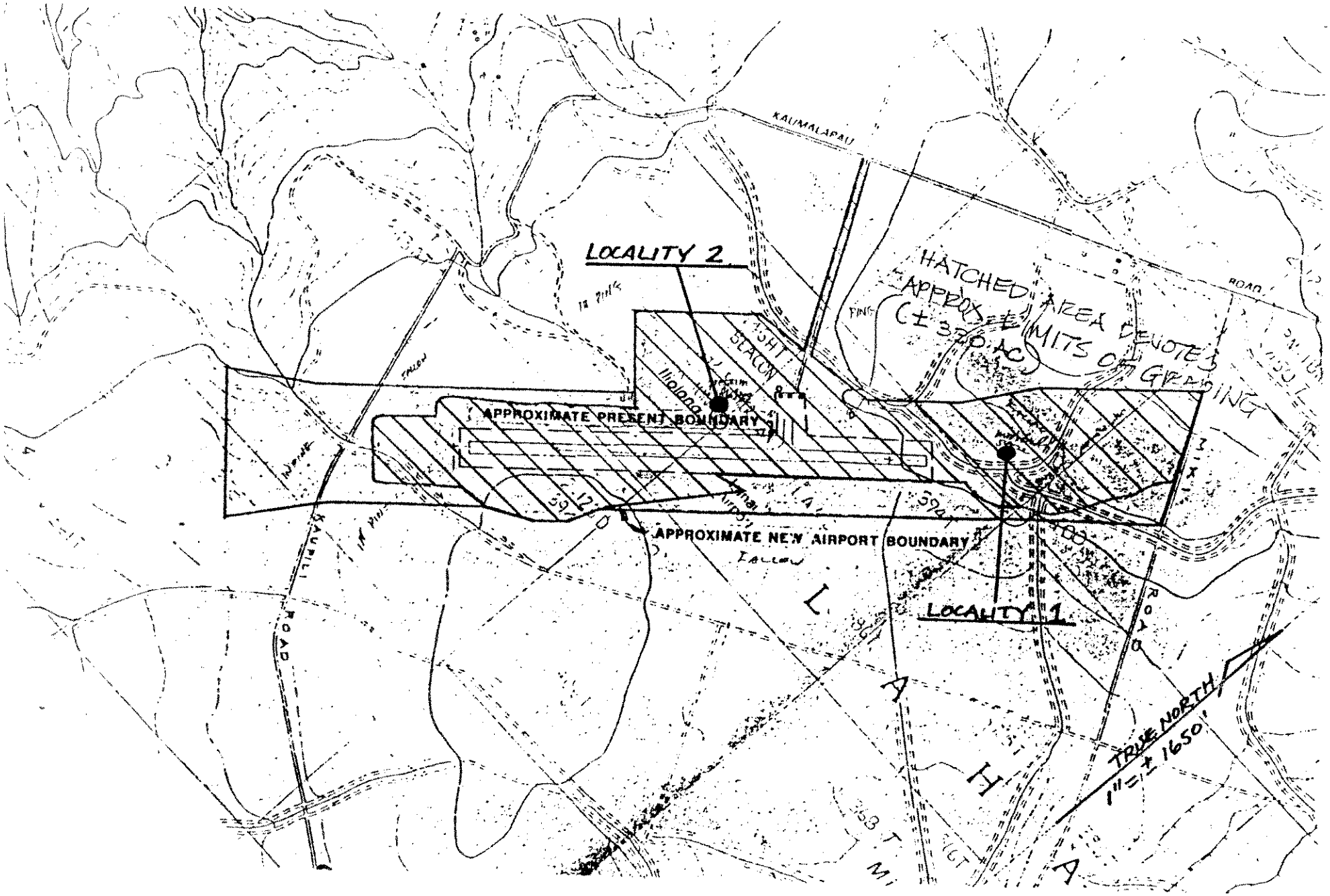
I will be away on vacation from 21 December to 2 January. Should you have any questions or comments, please contact Paul Cleghorn at 848-4126/-4189.

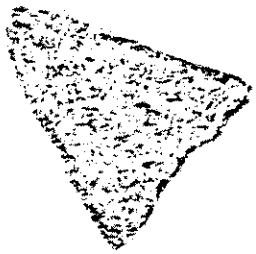
Sincerely,

Aki Sinoto

Aki Sinoto, Contract Manager
Public Archaeology Section
Applied Research Group

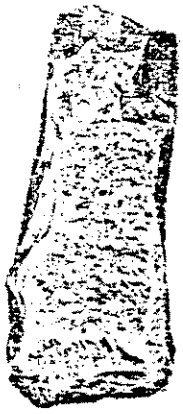
attachments


LOCALITY 2
HATCHED AREA DENOTES APPROX. LIMITS OF GRADING (± 370 AC)
APPROXIMATE PRESENT BOUNDARY
APPROXIMATE NEW AIRPORT BOUNDARY
LOCALITY 1
KAUMALAPAU
ROAD
TRUE NORTH
1" = ± 1650'



faceted, stone fragment

LOCALITY ONE



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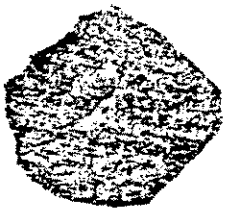

basalt flake

basalt flake

LOCALITY TWO

Figure 2. Artifacts Recovered from Localities One and Two
Shown Actual Size

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APPENDIX E

ARCHAEOLOGICAL SURVEY

AND TESTING FOR THE PROPOSED

LĀNA'I AIRPORT EXPANSION

by
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Prepared for

Lanai Company, Inc.

by
Cultural Surveys Hawaii
May, 1990

APPENDIX E

ABSTRACT

An archaeological inventory survey was conducted for areas associated with the proposed expansion of Lāna'i Airport. The survey was limited to areas outside of the existing facilities, including the fenced-off runway and apron. The survey included surface inspection of pineapple fields (and associated roads and ditches) in varying stages of usage from recently plowed to abandoned fields.

There was a total of seven (7) locations found which contained evidence of traditional Hawaiian basalt artifacts. Although some of the basalt materials are definitely indigenous Hawaiian artifacts, they occur with other basalt materials which are road gravel (from the local quarry) as well as locally occurring rock which has been mechanically altered.

Subsurface testing was conducted at the seven locations plus one additional test trench for a total of eight trenches. No subsurface features were observed in any of the trenches.

The survey and test trenching indicated that no surface features and probably no subsurface features associated with traditional Hawaiian usage of the project area could have remained intact, due to the 60+ years of commercial pineapple cultivation. Recommendations include no further archaeological work, except for "on-call monitoring" in the unlikely event a subsurface features is unearthed during construction.

ACKNOWLEDGEMENTS

The fieldwork was conducted by Mr. Rodney Chiogioji and Mr. Douglas F. Borthwick of Cultural Surveys Hawaii. We would like to thank John Walker of Lanai Co. and Marvin Clarabal (backhoe operator) of Dole for assisting us on Lanai. Their professional services and attitude was greatly appreciated. We would also like to thank Mr. Reginald Suzuka of Park Engineering and Mr. Dexter Kubota of KFC Airport, Inc. for supplying maps and helping in coordination of the project. Typing of the report was done by Dr. Vicki Creed of Windword Processing.

Special thanks to Dr. Hallett H. Hammatt for his continued guidance and support.

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I. INTRODUCTION AND SCOPE OF WORK

This report details the archaeological survey and test excavations associated with the proposed Lanai Airport Expansion. The project area includes some 500+ acres consisting of the existing runway, apron, support facility area(s) access road, and adjoining pineapple fields. The project was initiated at the request of Lanai Co. in response to requirements by the Department of Land and Natural Resources (DLNR). The recommended Scope of Work included "an archaeological inventory survey, consisting of surface collection of artifacts and limited subsurface testing" (DLNR Letter dated 2/6/90). The area of the existing facilities (runway, paved access road, parking, buildings) of Lāna'i Airport were not subject to survey or test excavations.

Survey of the adjoining pineapples located a total of seven localities which contained indigenous Hawaiian artifacts and/or fine grained basalt fragments. Subsurface testing, by a backhoe, was conducted at the seven locations and one additional location for a total of eight backhoe trenches. No subsurface features were observed in any of the trenches. The test trenching indicated that commercial pineapple cultivation has impacted the landscape to such a degree that it is very unlikely that any subsurface features associated with traditional Hawaiian use within the project area could have remained intact.

Because of the negative results, especially the subsurface testing, no further archaeological work is deemed necessary.

However, due to the possibility of unearthing a subsurface feature(s) during construction "on-call" monitoring by a qualified archaeologist is recommended.

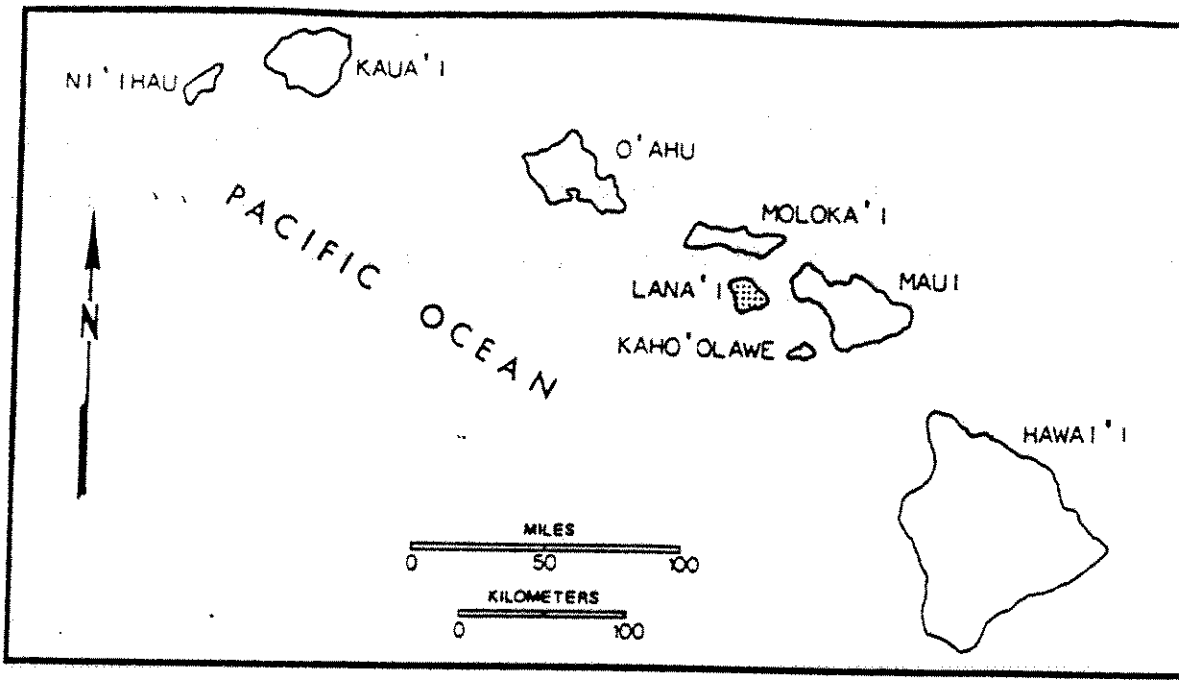

Fig. 1. State of Hawaii.

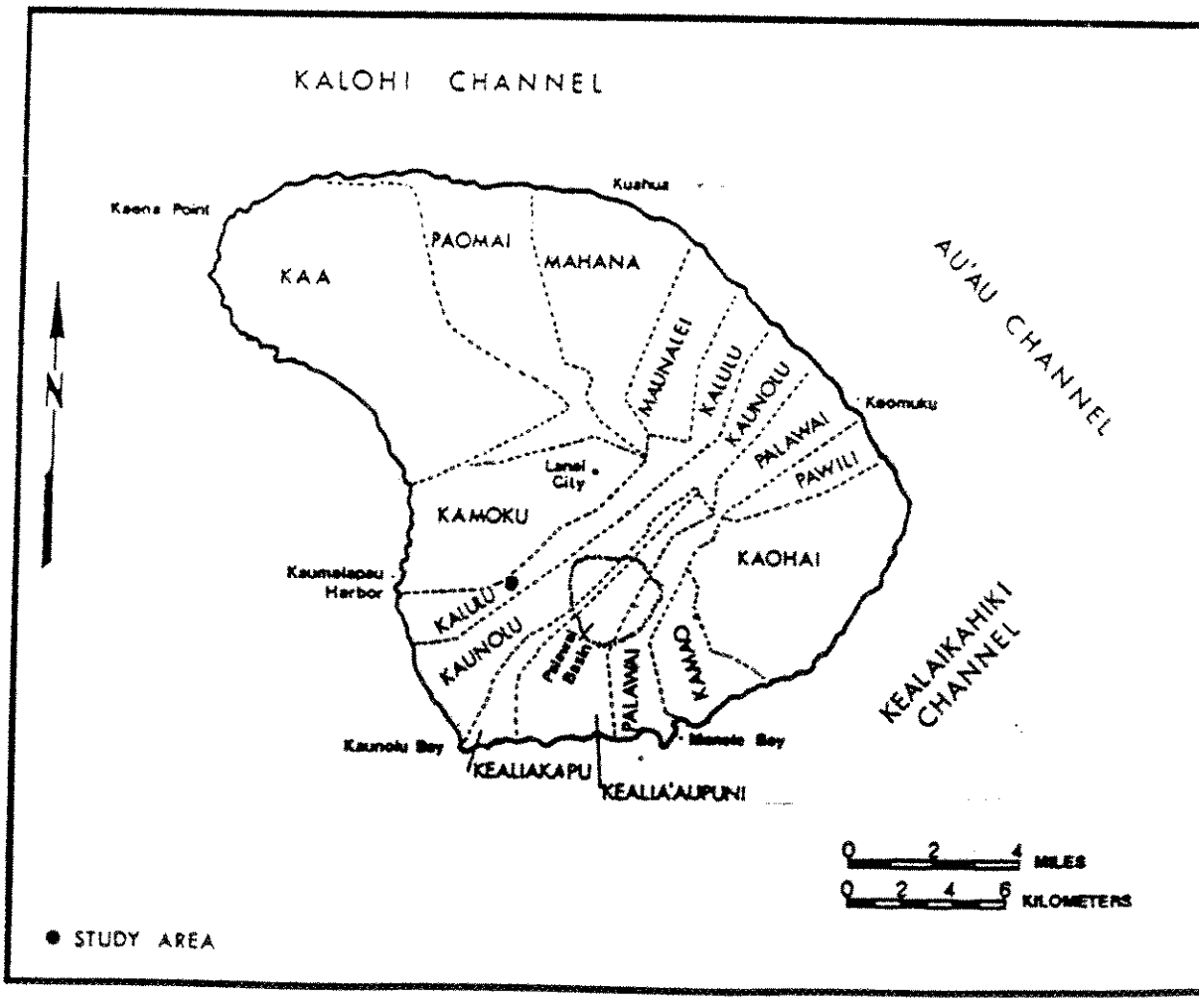

Fig.2. General Location Map Lana'i Island.

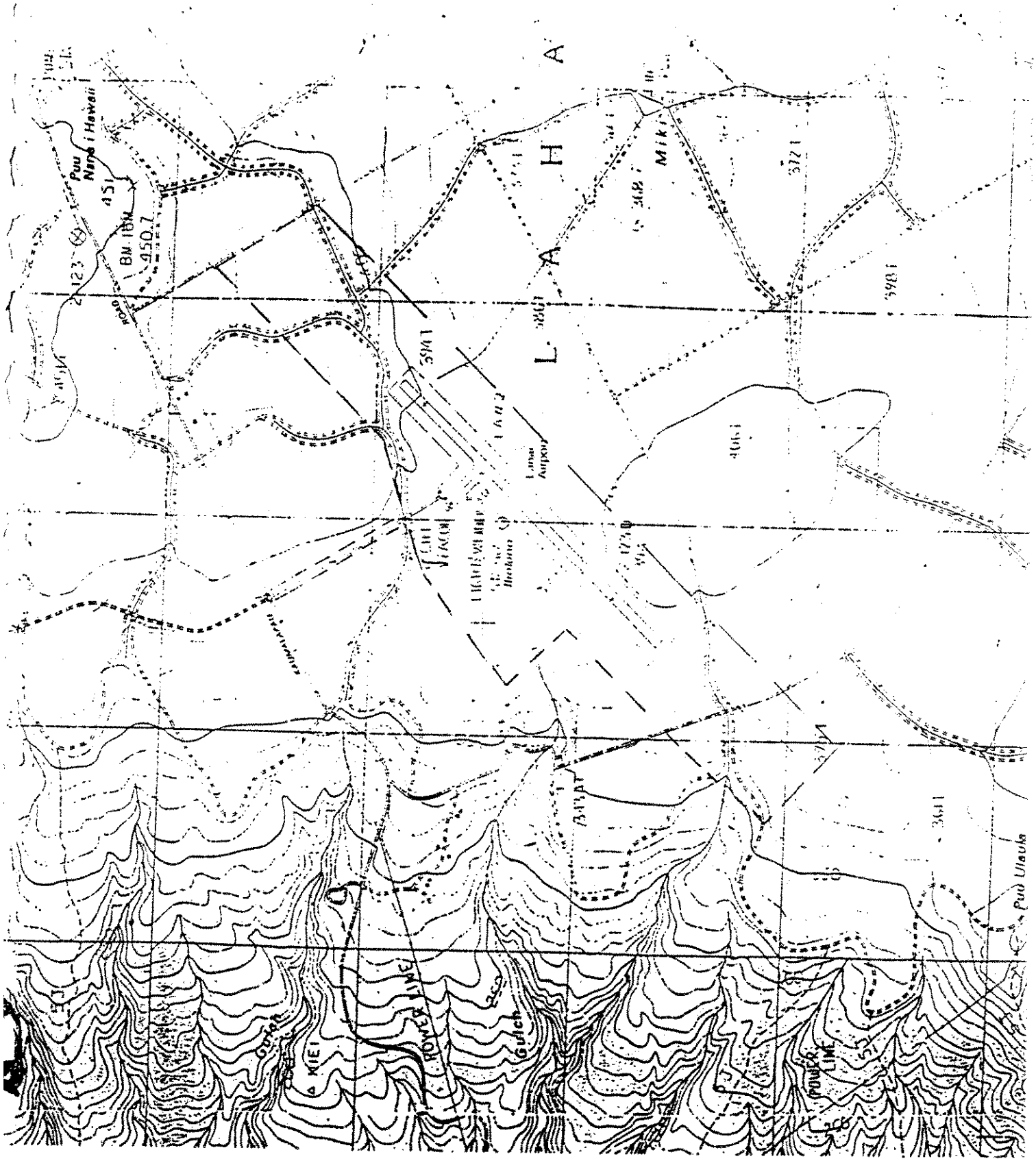

Figure 3 U.S.G.S. Map of Lāna'i (1-25,000), General Project Area

II. PROJECT AREA DESCRIPTION

The project area which encompasses both existing and proposed facilities covers some 500+ acres. It is situated on Lāna'i's central plateau at an elevation a range of 1200 to 1350 feet above sea level. The airport property is located just off Kaumalapau Hwy between Lāna'i City and Kaumalapau Harbor. The soils within the project area are classified as silty clay loams of the Molokai (MuA, MuB) and Uwala (UwB) series (Foote et al., 1972). Average annual rainfall, recorded at the airport is 20 inches per year. The dominant vegetation outside of the existing airport facilities is commercially grown pineapples. Various grasses are the dominant vegetation along the existing runways and in abandoned pineapple fields. In general, the project area, including existing facilities, is on agricultural lands which have been part of commercial pineapple production for approximately 60 years.

The project area, except for the access road from Kaumalapau Hwy, is within the traditional Hawaiian land unit (ahupua'a) of Kalulu. Kalulu is a relatively large ahupua'a (ca. 6,100 acres) which extends from the southern to the northern side of the island, over Lāna'i's central ridge. The project area is situated within the southern portion of Kalulu which encompasses nearly 4000 acres.

III. HISTORIC LAND USE

There are several sources dealing with the general history of Lāna'i. Notable among these are Emory (1924), L.K. Gay (1965), M. Ashford (1974), R. Tabrah (1976) and Lanai Ranch (1989). Recent archaeological work on Lāna'i has produced a number of reports with historical documentary sections summarizing Lāna'i history, with specific information relating to the individual project areas. The following is a brief summarization of historic land use based on the above-mentioned sources.

In prehistoric times, prior to Hawaiian occupation, the project area was probably at the fringe of the Native Hawaiian forest. Even in the early 1900s vestiges of this forest could be seen. "Most of the lands along the upper portion of the island were those above the 1,000 ft. elevation, as evidenced by the presence of dead tree skeletons along this elevation and above" (L.K. Gay, 1964:51). Clearing of this forest was undoubtedly initiated by the traditional subsistence farming practice of slash and burn clearing. In Emory's 1920 Survey of Lāna'i he noted that the upper plateau lands were intensively utilized for agriculture. The project, as stated earlier, was probably at the fringe of the forest line and also probably on the fringe of the lands used for intensive agriculture.

By the mid 1800s much of the upper plateau lands had changed to more open grass lands (pili) grass and scattered farms. This is indicated in the native and foreign testimonies given during the mid 1800s as part of the Mahele and Kuleana Acts. The

ahupua'a of Kalulu in which the project area lies, was "omitted" (Int. Dept. Memo 1888 Surveyor General) at the time of the Mahele (1840s) and was subsequently leased as government lands (ca. 1860). The Kuleana Act (ca. 1850s) allowed for individual ownership, mainly of relatively small plots of land for house and garden lots. The kuleana records show that no kuleana(s) were awarded within the project area. However, kuleana(s) were awarded in a part of Kalulu just mauka of the project area and in the adjacent ahupua'a of Kaunolu at roughly the same elevation as the airport property (Fig. 4). The kuleana within Kalulu was awarded to Kaawaeaina (LCA 8556:2,3). The LCAs within adjacent Kaunolu include 6818:1,2 to Haole, 6815:3 to Kaiwi, and 6922 to Kahukulani. The native and foreign testimonies and registers information is as follows:

8556 to Kaawaeaina
Section 1 - taro lo'i in Maunalei
Section 2 - Area of grass Kapanouka, Kalulu.
Section 3 - pauku of land, 'ili of Pueo Kamoku

Received the lands
Section 1 - 1844
Dection 2 - From parents during the time of Kamehameha II
Section 3 - From parents during time of Kamehameha I

6818 to Haole
Section 1 - Sweet potato garden, 'ili of Nuia, Kaunolu.
Section 2 - Grass area
Received lands from Pahula during time of Kamehameha I.

6815 to Kaiwi
Section 3 - Sweet potato and gourd garden and sugarcane and house site, 'ili of Miki, Kaunolu.

6822 to Kahukilani
Sweet potato garden and house lot received land from parents before 1829.

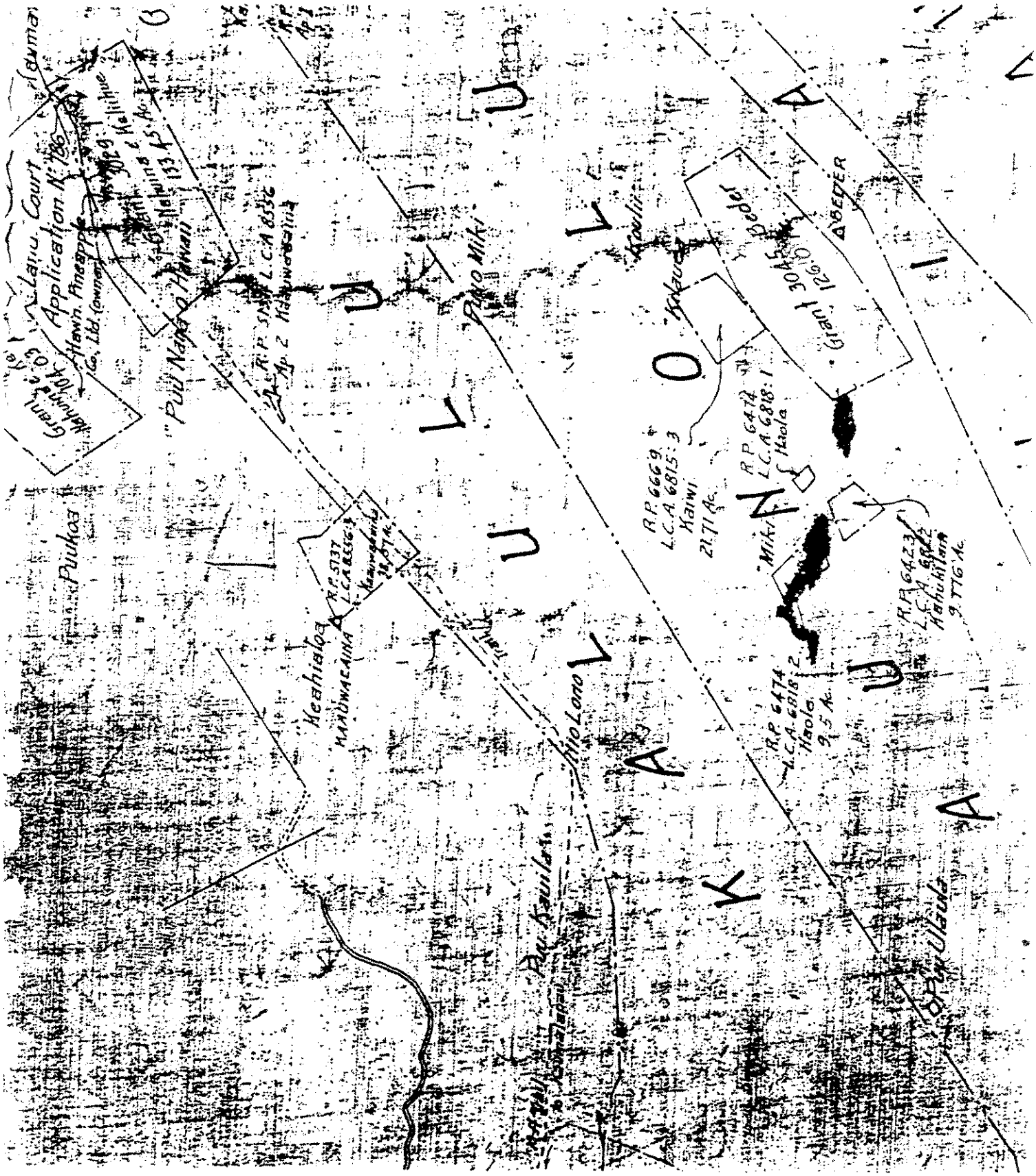

Figure 4 1927 Territory of Hawaii, Lāna'i Island Map, Showing LCAs and Grants

This information indicates that the project area was within a zone of agricultural use and associated habitation during the mid 1800s. Crops of sweet potato, sugarcane, and gourds were still being actively grown on lands adjacent to the project area.

In the 1860s leasing of government and Crown Lands for goat ranching replaced much of the more traditional subsistence life style on Lāna'i. The adjacent ahupua'a of Kamoku was leased to a Chinese man Ahsee, for raising goats. A portion of Kalulu (mauka of the airport - Puu Nana Hawaii) was leased to Nahuina and Keliihue in 1866 covering some 236 areas. In 1867 a Wm. Beder procures the lease of some 128 acres at Miki, Kaunolu. However, large-scale leasing of Government/Crown lands for goat and sheep ranching on Lāna'i was done by Walter Murray Gibson. W. M. Gibson was to go on and eventually control most of Lāna'i, mainly through leases.

Goat and sheep ranching dominated Lāna'i's economy from 1870 to 1920. There were up to 44,000 head of livestock on Lāna'i during the 1880s (Polk Husted Directory, 1884). Unrestricted grazing during this period led to severe erosional problems which are still evident over much of Lāna'i.

In the 1920s James Dole purchases most of the Island of Lāna'i and begins a rapid changeover to commercial pineapple. A number of major construction projects are initiated including, Kaumalapau Harbor, (old) Kaumalapau road, Lāna'i City and a new reservoir. The project area was probably put into pineapple cultivation by 1930. In the 1960s present day Lāna'i Airport was

built and dedicated.

IV. PREVIOUS ARCHAEOLOGY

The only known previous archaeological work specific to the Lāna'i Airport Expansion project was an "on-site assessment," conducted by Bishop Museum staff members Paul Cleghorn and Aki Sinoto in December 1989. They located "two localities (B.M. Locality 1 and B.M. Locality 2) with surface artifacts." Locality one contained a "possibly abrader, made of volcanic rock," and locality 2 contained "two basalt flakes, a small rectangular adz blank," and a "surface scatter primarily composed of basalt fragments although some midden and historics were observed" (Sinoto, 1989:2). With the discovery of the surface artifacts further archaeological work consisting of "further surface collection and test excavations" (Ibid.) was recommended.

The next closest recent archaeological work was conducted in association with a proposed landfill site (Ahlo, 1985; Nagata, 1987; Walker and Haun, 1987). The proposed landfill site was some 1000 ft. to the west of the present project area, "at the head of Kaumalapau Gulch in the land (ahupua'a) of Kamoku," (Walker and Haun, 1987:1). The archaeological research conducted at the proposed landfill site located eight sites which included four agricultural complexes, three temporary habitation shelters, and a trail marker (Ibid.) Test excavations "yielded an extremely limited range of prehistoric artifacts, a total of 17, including basalt flakes and shell scrapers and sparse to moderate amounts of midden" (Ibid.:ii). There were three radiocarbon dates obtained from two of the shelters and an agricultural

feature, with the dates clustered around 300±50 years before present, indicating a probable occupation in the 17th Century. The sites were characterized as "probable temporary habitation features and scattered probable agricultural features" (Ibid.:40).

The earliest known archaeological work with reference to the airport area was Kenneth P. Emory's island-wide survey during the early 1920's (Emory 1924a). Emory mentions the place names within the general vicinity of the airport as "Iliolono. Land section of Lono (25)" and "Puu-Kauila, Kauila (tree) Hill (74)" (Emory 1969:30, 36)(Fig. 5). Emory also observed scattered house sites along the general elevation contour (of the Palawai and Miki basins) as the airport and specifically mentions Puu-Kauila (Emory 1924b:27).

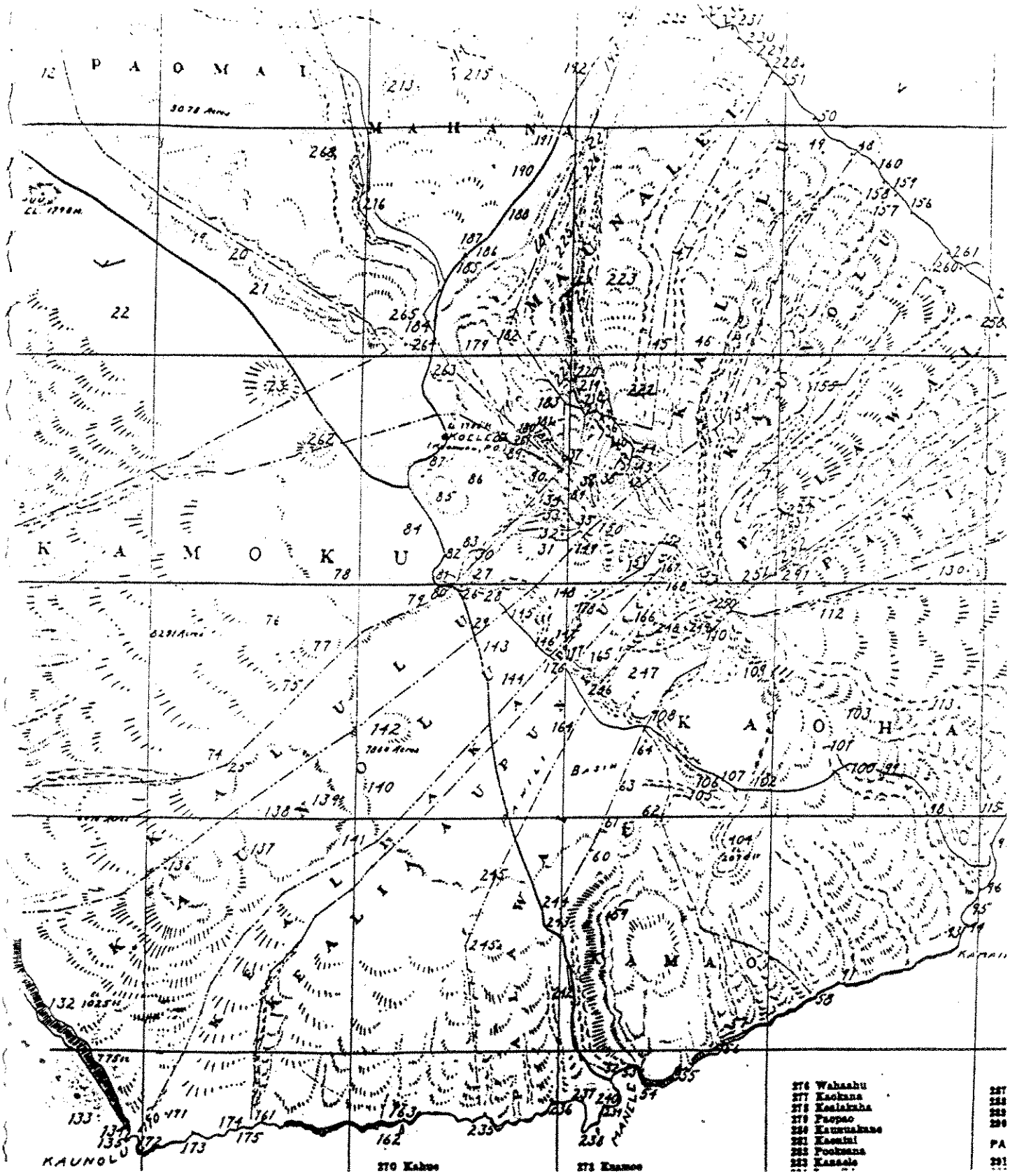

Figure 5 Potion of Emory's Place Name Map, Lāna'i Island Showing (25) <u>'Ili o Lono</u> and (74) <u>Pu'u Kauila</u>

V. SURVEY AND TESTING RESULTS

The survey of the proposed Lanai Airport expansion project area was confined to the pineapple fields surrounding the existing airport facilities, including the access road from Kaumalapau Hwy. The survey located (7) seven localities which contained identifiable traditional Hawaiian artifacts and/or fine grained basalt gravel. Two of the localities had previously been identified by Bishop Museum and are referred to as B. M. Locality 1 and B.M. Locality 2. The other 5 localities are referred to as CSH 1-5 (Fig. 6). Test trenching was conducted at or near these seven localities plus one additional trench. Trenching was done with a backhoe.

<u>CSH1</u> CSH1 is located adjacent (west) to the existing light beacon and aircraft rescue/fire fighting and maintenance building (ARFF). This locality consists of a dense surface scatter basalt gravel on a dirt road which parallels existing airport facilities. Within the scatter were fragments of dense, fine grained basalt and coarse grained basalt. No definitive flakes or other basalt artifacts were observed. Samples were collected for comparison purposes between the fine grained and coarse grained materials. Both varieties of basalt exhibited a typical angular blocky shape of mechanically crushed road gravel. The gravel ranged in size from cobbles to pebbles (9 cm x 4.5 cm x .2 cm -- 1.5 cm x 1.5 cm).

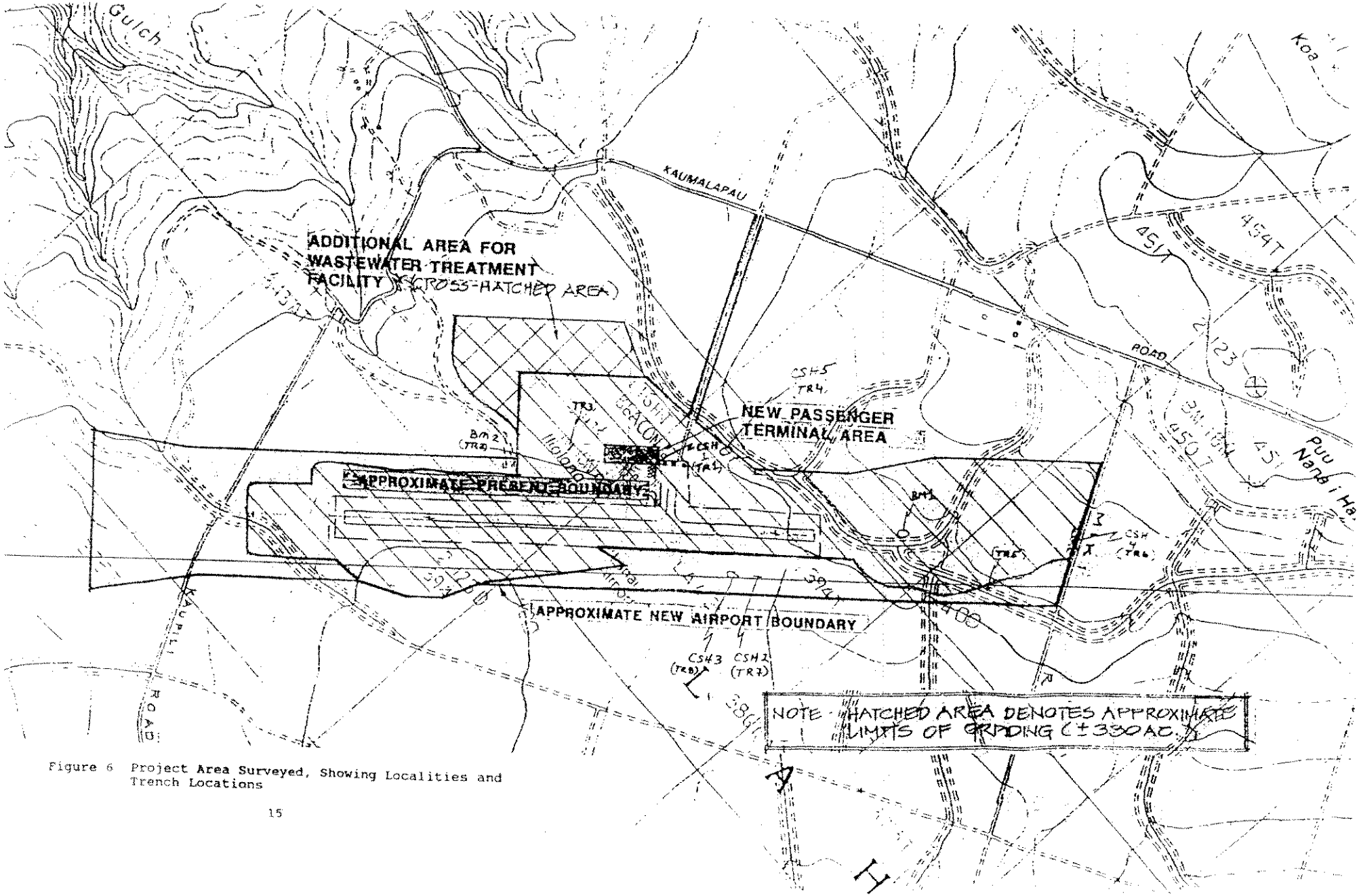

Figure 6 Project Area Surveyed, Showing Localities and Trench Locations

Trench 1 was excavated at CSH1 to sample the soil profile and to see if there was any subsurface feature associated with the surface scatter of gravel. The trench was 4 meters long by .7 meters wide and dug to a maximum depth of 1 meter. No subsurface features of any kind were observed. The soil profile consisted of three stratigraphic units (I, II, III).

Stratum	Horizon	Description
I. 0-40 cmbs	A-Horizon	2.5 yr 3/4 dark reddish brown silt clay loam, sticky plastic, moderate medium to coarse subangular blocky, abrupt smooth lower boundary, contained bits of black plastic (well developed plow pan)
II. 40-60 cmbs	B-Horizon	2.5 yr 2.5/4 dark reddish brown clay loam, moderate medium to coarse subangular blocky - some prismatic or columnar structure also - gradual wavy lower boundary
III. 60-100 cmbs	C-Horizon	10 yr 3/6 dark yellowish brown silty clay weak massive structure

Subsequent trenching at the other localities revealed essentially the same profile. There was also an identifiable "plow zone" that in most cases included some black plastic (utilized during planting phase of pineapple cultivation), pine plant mulch, and small flecks of burnt plant and plastic material (from burning of pineapple fields after harvesting). Below the plow zone (St. I) was either a culturally sterile B-Horizon layer (St. II) or in some cases the culturally sterile C-Horizon (St. III).

CSH2 CSH2 is located on the southeastern side of the existing runway. This locality contained of a very sparse surface scatter of basalt material and one piece of bone. There were three basalt artifacts observed and collected as well as the single piece of bone. Two of the Basalt artifacts are small abraders, one of scoria type basalt (4.5 cm x 3.5 cm x 1.5 cm). The other is of relatively fine grained material (4.2 cm x 2.5 cm x 1.2 cm). The other basalt artifact appears to be a fragment of a pounder and it measures 8.5 cm x 6.0 cm x 8.0 cm. The pounder fragment has recent scars due to probable mechanical activity (i.e., field plowing). The bone fragment (2.5 cm x 1.7 cm x 1.2 cm) is unworked and appears to be deer.

Trench 7 was excavated at CSH2 locality. The trench measured 5.5 meters long by .7 meters wide and was dug to a maximum depth of 1 meter. No subsurface features of any kind were observed. The stratigraphic profile revealed this standard three units, I, II and III as descried for Trench 1 (CSH 1). The plow zone was slightly shallower (only 30 cm thick) but the trench was situated within the center of a pineapple field road, where the artifacts were observed.

CSH 3 CSH 3 is located on the southeastern side of the existing runway some 300 ft. makai west of CSH 2 locality. CSH 3 is situated in a triangular shaped open area between the pine fields that also has a small irrigation pump station on one side. This locality contained a light surface scatter of basalt material, again mostly gravel. However, collected at this

locality were a basalt ulu maika (disc shaped bowling stone) two pieces of midden, two fragments of fine grained dense basalt, three possibly basalt files, one basalt flake, and one bottle glass fragment. The ulu maika measures 6.0 cm in diameter by 3.8cm thick and is made of vesicular basalt. The ulu maika has an obvious mechanically induced scar/gouge on one side. The two pieces of midden include one bone fragment and one shell fragment both unidentifiable. Of the two dense fine grained basalt fragments one has a ground surface and may have been part of an adz. The other fragment has a number of flake like scars that are probably due to mechanical alteration. The three possible basalt files are of soft coursed grained material and are characteristically triangluar in cross section but have no diagnostic abraded surfaces or facets. The singular basalt flake is of relatively coursed grained material, and exhibits no signs of purposeful retouching, but does have recent scars and fractures from mechanical means. The one piece of bottle glass collected is clear glass probably from a soda bottle.

Trench 8 was excavated at CSH 3 and was 5.7 meters by .7 meters by 1 meter deep. No subsurface features of any kind were observed. The stratigraphic profile revealed the standard three stratigraphic units, I, II, and III as described for Trench 1.

<u>CSH 4</u> CSH 4 is situated along the eastern (<u>mauka</u>) edge of the project boundary and consists of a relatively dense surface scatter of basalt gravel. The gravel occurs on a dirt road which parallels "macadamized" Miki road. For the most part the surface

scatter of gravel consists of fine grained dense basalt. A sample of 17 fragments was collected, none of which were traditional artifacts or have the appearance of being portions or fragments of artifacts. They all exhibit an angular blocky form with multiple flake type scars probably due to mechanized quarrying activities. The material probably comes from a source which contained dike basalt as cortex remains on some of the fragments. The dense surface scatter of the gravel at this particular location is directly related to the adjacent Miki road which was "macadamized", in part, by this type of basalt gravel.

Trench 6 was excavated at CSH4. It measured 6 meters by .7 meters by 1.1 meters deep. No subsurface features of any kind were observed. The excavation revealed the standard three stratigraphic units (I, II, III) as described for Trench 1. Stratum I represents the plow zone associated with pineapple cultivation, St. II is the undisturbed B-Horizon, and St. III is the underlying C-Horizon.

<u>CSH 5</u> CSH 5 is located on the northeastern side of the existing runway in an area of abandoned fields at the intersection of a small field road and a major field access road. This locality contained a light surface scatter of basalt gravel, a few pieces of midden and historics. Recovered from the surface scatter were two fragments of a basalt polishing stone, nine fine grained basalt fragments, three pieces of midden, one coarse grained basalt fragment and one 1971 U.S. penny.

The polishing stone, is of dense fine grained basalt. It is roughly rectangular in shape and measures 10.5 cm x 6.6 cm x 1.8 cm thick. The two pieces, which fit together, both exhibit recent scars and are probably parts of a slightly larger tool. The nine basalt fragments collected ranged from pebble to cobble size but did not exhibit any diagnostic flaking pattern. The pieces of midden observed and collected appear to e small fragments of cowry shall. The one coarse grained basalt fragment collected has an unusual shape, like that of a portion of a small bowl with a slightly flattened bottom. The fragment, which measures 6.5 cm x 5.6 cm x 3.0 cm, is too small to positively identify as an artifact but it may represent a portion of a mortar cup. The historic artifacts observed at locality CSH 5 were very sparse and of relatively recent origin including the 1971 penny collected.

Trench 4 was excavated at CSH 5. It measured 5.5 meters by .7 m by 1.2 meters deep. No subsurface features of any type were observed. The soil profile was slightly different in that only two stratigraphic units (I, III) were observed. Stratum I was the typical dark reddish brown silty clay loam plow zone which did contain some plastic sheeting material. However below Stratum I was undisturbed C-Horizon soil or Stratum III material. This indicates a locality specific pattern of plowing down to the C-Horizon. Also within the C-Horizon the backhoe unearthed a 50 to 60 cm in diameter in situ boulder of dense "blue rock". The backhoe operator indicated it was not that unusual an occurrence

in this general vicinity. Such boulders plowed and fragmented during decades of pineapple cultivation may represent some of the dense fine grained basalt fragments found scattered throughout the project area and other fields as well.

B.M. 1 B.M. 1 refers to Bishop Museum Locality 1 (Sinoto 1989). This locality is located some "1000 feet northeast of the mauka terminus of the existing runway" . . . "at the edge of a drainage or irrigation ditch" (Ibid). The museum observed and collected "a fragment of a pointed and faceted object, possibly an abrader, made from volcanic rock" (Ibid). During the present survey a probable adz fragment, one volcanic glass flake, and six fine grained basalt fragments were collected along the same ditch edge as described as B.M. 1. The basalt material was scattered along the north side of the ditch which runs roughly east-west. The surface scatter extends virtually the entire length of the ditch from B.M. 1 mauka to Miki road in varying degrees of concentration.

The adz fragment is of fine grained basalt, measures 5.8cm by 4.5cm by 1.5cm thick, has three ground surfaces, and appears to be the tip portion of a roughly rectangular shaped (in cross section) adz. The volcanic glass flake measures 1.9 cm by .8 cm by .4 cm thick and appears to have very recent shatter marks, probably from being run over by field equipment. The other fine grained material exhibits the characteristic angular blocky shapes of mechanically altered gravel.

Trench 5 was excavated where the surface scatter was most dense not at the precise location of B.M. 1. The trench was 7.5 meters long by .7 meters by 1.1 meters deep. The soil profile revealed the standard three stratigraphic units, I, II, and III. The bottom of the plow zone (St. I) was at 45 cm below surface and was marked by a lens of pineapple plant debris and black plastic. Otherwise no cultural material was observed.

B.M. 2 B.M. 2 is located "southwest of the existing terminal area on a slight rise" and "the area is near the site of a former terminal facility and appears to have been extensively disturbed previously" (Sinoto 1989). The museum collected "two basalt flakes and a small rectangular adz blank" and observed "some midden and historics" (Ibid). The present survey collected three additional basalt fragments and one fragment of bottle glass.

The three basalt fragments were of relatively fine grained material but do not appear to be purposefully flakes material rather they look like typical road gravel. The bottle glass fragment is a portion of the base of a hand blown bottle of dark green color. No bottle makers marks are present but the color and style of the fragment indicate a pre-1900 manufacture, probably closer to 1870.

Trench 2 was excavated at B.M. 2 and measured 5.7 meters by .7 meters by 1.3 meters deep. No subsurface features of any kind were observed. The soil profile revealed a slight variation of the standard three stratigraphic units (I, II, III). In this

trench the top 30 cm was a dark yellowish brown compact soil layer and appeared more like road fill and is probably related to the pre-existing terminal area adjacent to this locality. Below this road fill 30 to 70 cmbs was the more typical (St. I) dark reddish brown silty clay loam plow zone layer. Underlying the plow zone are undisturbed C-Horizon soils typical of Stratum III material though including some bedrock along the bottom of the trench.

Trench 3 (5.5 m x .7 m x 1 m deep) was excavated some 300 to the west of B.M. Locality 2. There was no surface scatter of basalt, rather the trench was dug randomly for comparison purposes. No subsurface features were observed. The soil profile revealed just two stratigraphic units (I, III). Stratum I being the plow zone and containing some black plastic and some highly weathered yellowish brown basalt rocks. The rocks came from the underlying C-Horizon, Stratum III, which had been disturbed by field plowing and mix into the plow zone. Also a large boulder (1 m in diameter) was unearthed from the C-Horizon. The backhoe operator indicating that this area was particularly rocky with large rocks close to the surface.

Table Summarizing Localities And Trenches

Locality	Trench	Comments
CSH 1	1	Road gravel, no subsurface features
CSH 2	7	(2) Artifacts, midden, no subsurface features
CSH 3	8	(3) Artifacts, midden, no subsurface features
CSH 4	6	Road gravel, no subsurface features
CSH 5	4	(2) Artifacts, no subsurface features
B.M. 1	5	(3) Artifacts, no subsurface features
B.M. 2	2	(4) Artifacts, midden, no subsurface features
	3	-------- no subsurface features

VI. SUMMARY AND RECOMMENDATIONS

The present investigation was conducted to locate and document the nature of surface scatters of stone artifacts in the area of the proposed Lāna'i Airport Expansion. To this end a surface survey of the area and limited test excavations were undertaken. This was done to try and determine the probable source of the artifactual material, as to whether it was from archaeological sites on the subject parcel and whether intact portions of these sites still exist or was the material imported to the parcel for road surfacing or other modern activities. In addition historical background research was conducted to determine previous land use.

Through the number of clearly identifiable indigenous Hawaiian artifacts collected was low (12) it appears most likely that they were originally associated with archaeological sites in the vicinity of where they were found. The only instances of intense surface scatters of basalt gravel with very few if any artifacts were places either next to existing roads (CSH 4) or buildings (CSH 1).

The subsurface testing results, from eight backhoe trenches, confirm historical information that the subject parcel has been under commercial cultivation for decades (CA. 60 years). The landscape has been subjected to bulldozing and plowing numerous times. A well developed plow zone extends to depths of 45 cms below surface, and any original archaeological context would have been destroyed years ago. Further evidence of this mechanical

alteration of the landscape and its archaeological context can be seen in the recovered artifacts themselves with every one either being a fragment of an artifact and/or having scars or gouges on them.

Historical information on the project area indicates that the area was probably in forest up to the native Hawaiian clearing for agriculture use. This portion of the upland plateau was probably at the fringe or edge of the area used for intensive dry land agriculture. Though no Kuleana(s) (LCA's) were awarded within the project area information gleaned from nearby kuleana indicate that during the mid 1800s crops of sweet potato, sugarcane, and gourds were being actively grown along the same general contour elevation. However, by the 1860s and 1870s goat and sheep ranching began to dominate Lanai's economy. The ahupua'a of Kalulu, in which the airport lies, came under the lease hold of Walter M. Gibson and by the 1880's there were some 44,000 goats, sheep, horse and cattle foraging on Lāna'i. In the early 1920's, Kenneth P. Emory conducted an island-wide survey and briefly alluded to house sites in the general vicinity of the airport property. Emory also mentions the place name of Ili o Lono which may have been an important location during traditional times. Ili o Lono may refer to a section of land connected in some way to the Hawaiian God Lono the "principal deity of agriculture and fertility" (Kirch 1985:322). The present airport facilities are located at Ili o Lono.

Commercial pineapple cultivation began to dominate Lanai's economy shortly after Emory's survey with the purchase of most of Lāna'i by James Dole. During the 1920s and 30s major construction projects (harbor, roads, reservoir) took place which included extensive quarry activities mainly at Kaumalapau but also within Miki basin (informant Marvin Clarabal). It is also during this time that the project area went to full time pineapple cultivation. Pineapple cultivation is still active in most of the project area. The present airport runway and facilities were dedicated in 1966.

It is clear that some of the fine grained and coarse grained basalt materials collected are archaeological artifacts and their original content was from an archaeological site which may or may not have been on the subject parcel. However, the testing proved how unlikely finding a subsurface feature associated with the surface artifacts is, or for that matter, finding any intact subsurface indigenous Hawaiian features within the entire project area.

The research indicates that the project area was utilized during traditional times for agriculture and probably associated habitation. Subsequent commercial pineapple cultivation has homogenized the landscape to such a degree that it is doubtful any subsurface cultural features still exist within the project area. No further archaeological work is deemed necessary. However, in the unlikely event a subsurface feature is unearthed during construction activities, "on-call" monitoring by a

qualified archaeologist is recommended. This should include a contractual agreement to be "on-call," as well as analysis of any recovered materials.

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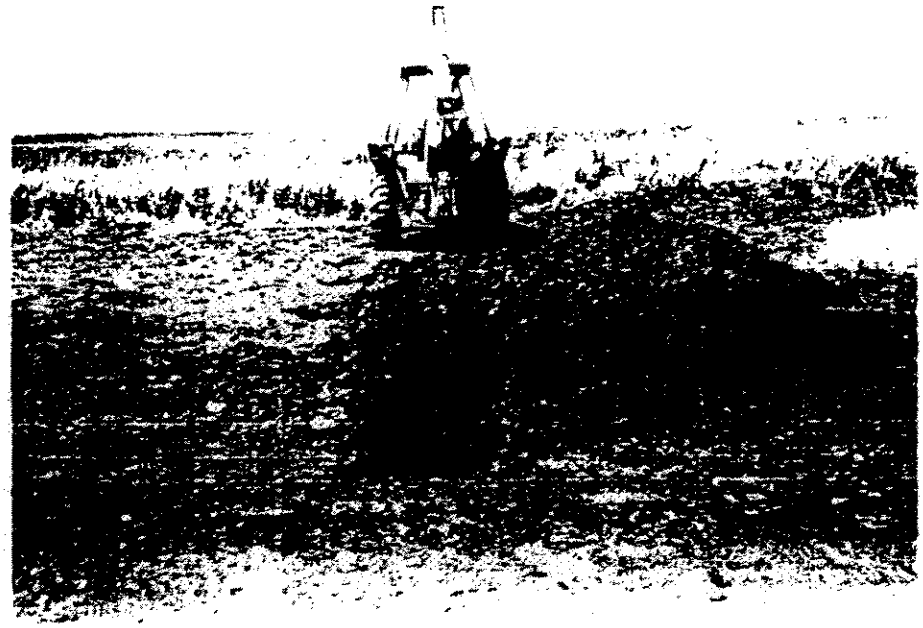
VIII. PHOTO APPENDIX

Existing Airport Facilities, View from B.M. 2

Newly Plowed Field Makai (West) of Runway.

CSH1, View to North



CSH1, Trench 1, post-Excavation

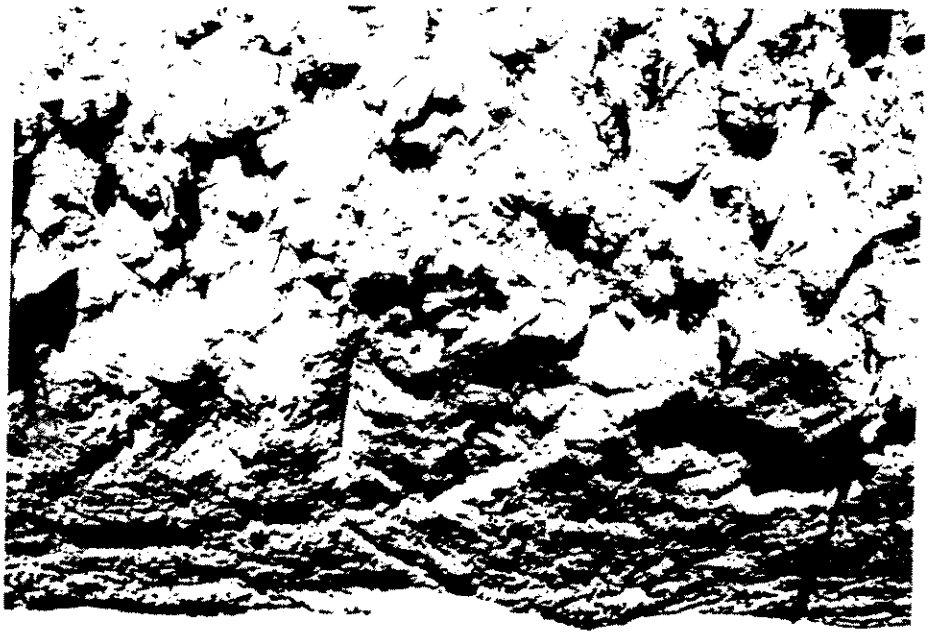
Sample of Abandoned Pineapple Field Vegetation

General View of Project Area with Existing Runway in Background

B.M. 2 pre-Excavation, Trench 2

B.M.2 post-Excavation, Trench 2

CSH4, Trench 6, post-Excavation



CSH2, Trench 7, Showing Black Plastic in Profile

APPENDIX F

United States Department of the Interior
FISH AND WILDLIFE SERVICE
PACIFIC ISLANDS OFFICE
P O BOX 50167
HONOLULU, HAWAII 96850

OCT 25 1989

Mr. John Sanders
Aries Consultants
10 Twin Dolphin Drive
Suite R
Redwood City, California 94065

Dear Mr. Sanders:

This responds to your request earlier today for information on federally listed endangered and threatened species of plants and animals which may be found on the island of Lanai, Hawaii. There are four such species: One bird, the Hawaiian dark-rumped petrel, and three plants, Kokia drynarioides, Santalum freycinetianum var. lanaiense, and Gardenia brighamii. I have enclosed a list of endangered and threatened species found in Hawaii with notations on their distributions by island.

Specific to your interest in listed species which may be found in the vicinity of the Lanai Airport, no listed species are found in this area.

Should you have any further questions, please contact us at (808) 541-2749.

Sincerely yours,

Ernest Kosaka
Field Office Supervisor
Office of Environmental Services

Enclosure

SPECIES IN THE STATE OF HAWAII WHICH ARE LISTED BY THE FEDERAL GOVERNMENT AS ENDANGERED OR THREATENED

UPDATED: SEPTEMBER 1989

		CURRENT DISTRIBUTION						
		HAW	MAU	LAN	MOL	OAH	KAU	NW
MAMMALS (9)								
Bat, Hawaiian hoary	Lasiurus cinereus semotus	X						
Seal, Hawaiian monk [CH]	Monachus schauinslandi							X
Whale, blue	Balaenoptera musculus							
Whale, finback	Balaenoptera physalus							
Whale, gray	Eschrichtius robustus							
Whale, humpback	Megaptera novaeangliae							
Whale, right	Balaena glacialis							
Whale, Sei	Balaenoptera borealis							
Whale, sperm	Physeter catodon							
BIRDS (30)								
Akepa, Hawaii (honeycreeper)	Loxops coccineus coccineus	X						
Akepa, Maui (honeycreeper)	Loxops coccineus ochraceus		X					
Akialoa, Kauai (honeycreeper)	Hemignathus procerus						X	
Akiapolaau (honeycreeper)	Hemignathus monroi (=wilsoni)	X						
Coot, Hawaiian (=alae keo keo)	Fulica americana alai	X	X		X	X	X	
Creeper, Hawaii	Oreomystis (=Loxops) mana	X						
Creeper, Molokai (=kakawahie)	Paroreomyza (=Oreomystis =Loxops) flammea				X			
Creeper, Oahu (=alauwahio)	Paroreomyza (=Oreomystis =Loxops) maculata					X		
Crow, Hawaiian (='alala)	Corvus hawaiiensis (=tropicus)	X						
Duck, Hawaiian (=koloa)	Anas wyvilliana	X				X	X	
Duck, Laysan	Anas laysanensis							X
Finch, Laysan (honeycreeper)	Telespyza (=Psittirostra) cantans							X
Finch, Nihoa (honeycreeper)	Telespyza (=Psittirostra) ultima							X
Goose, Hawaiian (=nene)	Nesochen (=Branta) sandvicensis	X	X					
Hawk, Hawaiian (=Io)	Buteo solitarius	X						
Honeycreeper, crested (='akohekohe)	Palmeria dolei		X					
Millerbird, Nihoa (old world warbler	Acrocephalus familiaris kingi						X	

		CURRENT DISTRIBUTION						
		HAW	MAU	LAN	MOL	OAH	KAU	NW
Moorhen (=gallinule), Hawaiian common	Gallinula chloropus Sandvicensis				X	X	X	
Nukupu'u (honeycreeper)	Hemignathus lucidus		X				X	
'O'o, Kauai (='O'o 'A'a) (honeyeater)	Moho braccatus						X	
'O'u (honeycreeper)	Psittirostra psittacea	X					X	
Palila (honeycreeper) [CH]	Loxioides (=Psittirostra) bailleui	X						
Parrotbill, Maui (honeycreeper)	Pseudonestor xanthophrys		X					
Petrel, Hawaiian dark-rumped	Pterodroma phaeopygia sandwichensis	X	X	X				
Po'ouli (honeycreeper)	Melamprosops phaeosoma	X						
Shearwater, Newell's Townsend's (formerly Manx) (='A'o)*	Puffinus auricularis (formerly puffinus) newelli	X					X	
Stilt, Hawaiian (=Ae'o)	Himantopus himantopus knudseni	X	X		X	X	X	
Thrush, large Kauai	Myadestes (=Phaeornis) myadestinus						X	
Thrush, Molokai (=oloma`o)	Myadestes (=Phaeornis) lanaiensis (=obscurus) rutha				X			
Thrush, small Kauai (=puaiohi)	Myadestes (=Phaeornis) palmeri					X		

REPTILES AND AMPHIBIANS (5)

Turtle, green sea*	Chelonia mydas	All sea turtles listed may be found in Hawaiian waters.
Turtle, hawksbill sea (=carey)	Eretmochelys imbricata	
Turtle, leatherback sea	Dermochelys coriacea	
Turtle, loggerhead sea*	Caretta caretta	
Turtle, Olive (Pacific) Ridley sea*	Lepidochelys olivacea	

FISHES (0) None

INVERTEBRATES (1 Genus)

				OAHU			
Snail, Oahu tree	Achatinella spp. (all species)			X			

PLANTS (19)		CURRENT DISTRIBUTION						
		HAW	MAU	LAN	MOL	OAH	KAU	NW
NCN	*Achyranthes rotundata*					X		
NCN	*Haplostachys haplostachya* var. *angustifolia*	X						
NCN	*Lipochaeta venosa*	X						
NCN	*Stenogyne angustifolia* var. *angustifolia*	X						
NCN [CH]	*Gouania hillebrandii*		X					
`Ahinahina (Mauna Kea silversword	*Argyroxiphium sandwicense* ssp. *sandwicense*	X						
Carter's panicgrass [CH]	*Panicum carteri*					X		
Cooke's kokio	*Kokia cookei*				X			
Cuneate bidens	*Bidens cuneata*					X		
Diamond Head schiedea	*Schiedea adamantis*					X		
Dwarf naupaka	*Scaevola coriacea*		X		X			
Ewa Plains 'akoko	*Euphorbia skottsbergii* var. *kalaeloana*					X		
Hawaiian vetch	*Vicia menziesii*	X						
Kauai Hau Kuahiwi	*Hibiscadelphus distans*						X	
Koki'o (=hau-hele'ula or Hawaiian tree cotton) [CH]	*Kokia drynarioides*	X						
Ko'oloa'ula	*Abutilon menziesii*		X	X		X		
Lanai sandalwood	*Santalum freycinetianum* var. *lanaiense*			X				
Na'u (Hawaiian gardenia)	*Gardenia brighamii*			X	X	X		
Uhiuhi	*Mezoneuron kavaiense* (Mann)	X				X	X	

NOTES:
*All above are listed as ENDANGERED except the green sea turtle, leatherback sea turtle, Olive Ridley sea turtle and the Newell's Townsend's shearwater, which are listed as THREATENED.

This information was taken from 50 CFR 17.11 and 17.12 of January 1, 1989

NCN= No Common Name
CH = Critical Habitat designated

APPENDIX G

BOTANICAL SURVEY
LANA'I AIRPORT EXPANSION
ISLAND OF LANA'I, HAWAI'I

by

Winona P. Char

CHAR & ASSOCIATES
Botanical/Environmental Consultants
Honolulu, Hawaii

Prepared for: **PARK ENGINEERING**

December 1989

APPENDIX G

SECTION 1
INTRODUCTION

1.1 OVERVIEW

On 10 November 1989, a botanical survey of the lands proposed for expansion of the Lana'i Airport was conducted. Vegetation on the project site consists principally of actively cultivated pineapple fields while smaller portions of the site support scrub vegetation whose main components are a mixed association of grasses and scattered shrubs. These areas with scrub vegetation, for the most part, represent fallow fields now overgrown. A total of 43 species of vascular plants occur on the site. Of these, 39 (91%) are introduced or alien species and 4 (9%) are native. None of the species inventoried is considered rare, threatened, or endangered.

1.2 SURVEY METHODS

Prior to undertaking the field studies, a search was made of the pertinent literature to familiarize the principal investigator with other botanical studies conducted in the general area. Topographic maps were examined to determine access onto the site, terrain characteristics, boundaries, and reference points.

A walk-through survey method was employed. Uncultivated areas were more likely to harbor native species and were thus more intensively examined. Notes were made on plant associations and distribution, substrate types, topography, exposure, etc. Species which could not be positively identified were collected for later determination in the herbarium (U. H., Manoa) and for comparison with the recent taxonomic literature.

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SECTION 3 -- DISCUSSION AND RECOMMENDATIONS	4
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SECTION 2

DESCRIPTION OF THE VEGETATION

2.1 PINEAPPLE FIELDS

Roughly 70% of the lands proposed for the airport expansion are presently under pineapple cultivation. Some fields have been recently harvested, others contain plants with very young, green fruit. Pineapple plants (*Ananas comosus*) are xeromorphic, rosette-shaped, short-stemmed perennials with long, stiff, prickly-edged, bluish-gray leaves. Each plant bears one fruit; the fruit, a multiple fruit, consists of many six-sided berries arranged spirally and embedded in the juicy pulp of the stem (Neal 1965). They are planted in rows following along the contour of the land and, at maturity, form an almost closed, gray-green, harsh vegetation up to 3 ft. tall.

There are few weedy species associated within the fields themselves as the closely packed pineapple plants tend to exclude all other species. However, along the margins of fields, along roadsides, and drainage ditches, clumps of weedy species are found. The most commonly encountered plants are sourgrass (*Digitaria insularis*), Guinea grass (*Panicum maximum*), Natal redtop (*Rhynchelytrum repens*), Dallis grass (*Paspalum dilatatum*), and 'uhaloa (*Waltheria indica*). Pangolagrass (*Digitaria decumbens*) is found along one of the main roads where it has been planted for soil erosion control.

One field on the southern portion of the project site has recently been harvested and the crop plowed under. This open field supports scattered patches of grasses, weedy herbs, and small shrubs such as balloon plant (*Asclepias physocarpa*), wild bittermelon (*Momordica charantia*), Natal redtop, Guinea grass, Asiatic butterfly bush (*Buddleia asiatica*), hairy horseweed (*Conyza bonariensis*),

and weed verbena (Verbena litoralis). Locally common are pineapple plants which have resprouted.

2.2 SCRUB VEGETATION

Generally, scrub vegetation occurs on abandoned pineapple fields; black plastic strips used for mulching as well as a few pineapple plants can still be found in these areas. On fields which have been abandoned for some time, the weedy plant cover may be 80 to 90%. Scrub vegetation is typified by a mixed grass association, principally Guinea grass, Dallis grass, sourgrass, and Natal redtop, and scattered shrubs and subshrubs. These include balloon plant, 'ilima (Sida fallax), Asiatic butterfly bush, 'uhaloa, haole-koa (Leucaena leucocephala), indigo (Indigofera suffruticosa), and Cuba jute (Sida rhombifolia). A few small shrubs of the native false sandalwood or naio (Myoporum sandwicense) and a'ali'i (Dodonaea viscosa), 3 to 5 ft. tall, also occur in this vegetation type. Locally abundant in the scrub is the yellow-flowered telegraph plant (Heterotheca grandiflora).

Also included in the scrub vegetation type is a portion of the small gulch located near Kaupili Road. Because of the steepness of its slopes, this area has never been cultivated. The scrub on this part of the study site consists of clumps of koa-haole shrubs interspersed among Guinea grass. One small stand of ironwood trees (Casuarina equisetifolia), 12 to 18 ft. tall, and a few scattered trees of silk-oak trees (Grevillea robusta) also occur in this area. Common in this scrub are 'ilima and the lavender-flowered koali vine (Ipomoea cairica).

2.3 THREATENED AND ENDANGERED PLANTS

No officially listed threatened or endangered plants occur on the project site; nor are there any plants candidate or proposed for

such status on the property (U. S. Fish and Wildlife Service 1985; Herbst 1987).

Four plant species occurring on the site are considered indigenous, i.e., native to the Hawaiian Islands and elsewhere; these are the 'ilima, 'uhaloa, naio, and a'ali'i. These four species are found throughout the islands in similiar environmental habitats. No endemic plants , i.e., native only to the islands, were found during the field studies.

SECTION 3
DISCUSSION AND RECOMMENDATIONS

3.1 SUMMARY OF FINDINGS

The majority of the vegetation on the site consists of actively cultivated pineapple fields. Weedy species associated with agricultural lands are found more commonly along the less well-maintained areas such as roadsides, drainageways, and margins of fields. Scrub vegetation, which covers roughly 30% of the property, is usually found on abandoned pineapple fields. This vegetation type is composed of a mixed grass association with scattered shrubs. A small gulch area near Kaupili Road supports scatttered koa-haole shrubs and Guinea grass scrub.

There is very little of botanical interest within the lands proposed for the airport expansion. Actively cultivated fields or weedy scrub are the major vegetation types. Of the 43 species inventoried on the site, 39 (91%) are introduced. Because of the past agricultural activities, there are no sensitive native plant communities remaining on the study site. None of the native plants are rare, threatened, or endangered.

3.2 RECOMMENDATIONS

There are no botanical limitations to the development of the project site. The proposed expansion of the airport is not expected to have a significant negative impact on the total island-wide populations of the species involved; the majority are introduced and the few natives on the site also occur in similiar environmental habitats throughout the islands.

Of some concern, however, is the loss of soil through wind and water. It is recommended that areas cleared or grubbed of vegetation be landscaped as quickly as possible. Native plants found on Lana'i are suggested for landscaping as they are already adapted to the local growing conditions. They would require less water and maintenance. Two native shrubs, the false sandalwood or naio and a'ali'i, already occur on the site and are doing well. The naio has attractive, glossy green leaves and fragrant white flowers. A'ali'i is a hardy, drought-tolerant shrub which produces showy red, papery flowers. Other natives which could be used include the Lana'i nehe (*Lipochaeta*); all the Hawaiian nehes are closely related to *Wedelia*, a commonly used ground cover. Wiliwili (*Erythrina sandwicensis*), with its many-hued pastel colors ranging from chartreuse to salmon-red, would make an excellent tree specimen.

SECTION 4
PLANT SPECIES FOUND ON THE SITE

Following is a checklist of all those vascular plants inventoried during the field studies. Plant families are arranged alphabetically within two groups of flowering plants: Monocots and Dicots. The taxonomy and nomenclature of the flowering plants follow Wagner *et al*. (in press). In most cases, common English and/or Hawaiian names given follow St. John (1973) or Porter (1972).

For each species, the following information is provided:

1. Scientific name with author citation.
2. Common English and/or Hawaiian name, when known.
3. Biogeographic status. The following symbols are used:
   I = indigenous = native to the islands and also to one or more other geographic area(s)
   X = introduced or alien = all those plants brought to the islands intentionally or accidentally after Western contact (1778).

Note -- no endemic plants (i.e., native only to the islands) or Polynesian introduced plants (i.e., introduced prior to 1778) were found on the site during the field studies.

SCIENTIFIC NAME	COMMON NAME	STATUS
MONOCOTS		
BROMELIACEAE (Pineapple Family)		
Ananas comosus (Stickm.) Merr.	pineapple	X
POACEAE (Grass Family)		
Bothriochloa pertusa (L.) A. Camus	pitted beardgrass	X
Cenchrus echinatus L.	common sandbur, 'ume'alu	X
Chloris barbata (L.) Sw.	swollen finger grass, mau'ulei	X
Chloris gayana Kunth	Rhodes grass	X
Digitaria decumbens Stent	pangolagrass	X
Digitaria insularis (L.) Mez. ex Ekman	sourgrass	X
Eleusine indica (L.) Gaertn.	wire grass	X
Panicum maximum Jacq.	Guinea grass	X
Paspalum dilatatum Poir.	Dallis grass	X
Rhynchelytrum repens (Willd.) Hubb.	Natal redtop	X
DICOTS		
AMARANTHACEAE (Amaranth Family)		
Amaranthus viridus L.	slender amaranth, pakai	X
ASCLEPIADACEAE (Milkweed Family)		
Asclepias physocarpa (E. Mey.) Schlechter	balloon plant	X
ASTERACEAE (Sunflower Family)		
Bidens pilosa L.	Spanish needle, beggar's tick	X
Calyptocarpus vialis Less.	hierba del cabello	X
Conyza bonariensis (L.) Cronq.	hairy horseweed, ilioha	X
Emilia fosbergii Nicolson	red pualele	X
Emilia sonchifolia (L.) DC.	purple pualele	X
Heterotheca grandiflora Nutt.	telegraph plant	X
Sonchus oleraceus L.	sow thistle, pualele	X
BRASSICACEAE (Mustard Family)		
Lepidium virginicum L.	wild peppergrass	X

SCIENTIFIC NAME	COMMON NAME	STATUS
BUDDLEJACEAE (Butterfly Bush Family)		
Buddleia asiatica Lour.	Asiatic butterfly bush, huelo-'ilio	X
CASUARINACEAE (Ironwood Family)		
Casuarina equisetifolia L.	common ironwood	X
CHENOPODIACEAE (Goosefoot Family)		
Atriplex semibaccata R. Br.	Australian saltbush	X
CONVOLVULACEAE (Morning-glory Family)		
Ipomoea cairica (L.) Sweet	koali	X?
Merremia aegyptia (L.) Urban	hairy merremia, koali kua hulu	X?
CUCURBITACEAE (Gourd Family)		
Momordica charantia L.	wild bittermelon	X
EUPHORBIACEAE (Spurge Family)		
Chamaesyce hirta (L.) Millsp.	hairy spurge, garden spurge	X
FABACEAE (Pea Family)		
Desmodium triflorum (L.) DC.	three-flowered beggarweed	X
Indigofera suffruticosa Mill.	indigo, 'iniko	X
Leucaena leucocephala (Lam.) de Wit	koa-haole	X
Macroptilium lathyroides (L.) Urb.	cow pea	X
MALVACEAE (Mallow Family)		
Malvastrum coromandelianum (L.) Garcke	false mallow, hauuoi	X
Sida fallax Walp.	'ilima	I
Sida rhombifolia L.	Cuba jute	X
MYOPORACEAE (Myoporum Family)		
Myoporum sandwicense A. Gray	naio, false sandalwood	I
PLANTAGINACEAE (Plantain Family)		
Plantago lanceolata L.	narrow-leaved plantain	X

SCIENTIFIC NAME	COMMON NAME	STATUS
PORTULACACEAE (Purslane Family)		
Portulaca oleracea L.	common purslane, pigweed	X
PROTEACEAE (Protea Family)		
Grevillea robusta A. Cunn. ex R. Br.	silk oak	X
SAPINDACEAE (Soapberry Family)		
Dodonaea viscosa Jacq.	a'ali'i	I
SOLANACEAE (Tomato Family)		
Lycopersicon pimpinellifolium (Jusl.) Mill.	wild tomato, current tomato	X
STERCULIACEAE (Cocoa Family)		
Waltheria indica L.	'uhaloa, hi'aloa	I?
VERBENACEAE (Verbena Family)		
Verbena litoralis Kunth	owi, oi	X

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